INSIDE: MEET THE WALLEYE'S COLORFUL LITTLE COUSIN

Montana Outdoors

MONTANA FISH, WILDLIFE & PARKS | $2.50

MAY–JUNE 2009

TROPHY TROUT

Why they want your tiniest dry flies

BIRDSCAPING

CLOCKING STREAM SPEED

ORO Y PLATA...Y SALMONIDAE?

CATCH FISH WITH YOUR KIDS THIS WEEKEND

Montana Fish, Wildlife & Parks

fwp.mt.gov

STATE OF MONTANA
Brian Schweitzer, Governor

MONTANA FISH, WILDLIFE & PARKS
Joe Maurier, Director
Chris Smith, Deputy Director
Gary Bertellotti, Chief of Operations (Acting)

MONTANA FWP COMMISSION
Shane Colton, Chairman
Willie Doll
Ron Moody
Bob Ream
Dan Vermillion

COMMUNICATION AND EDUCATION DIVISION
Ron Aasheim, Administrator

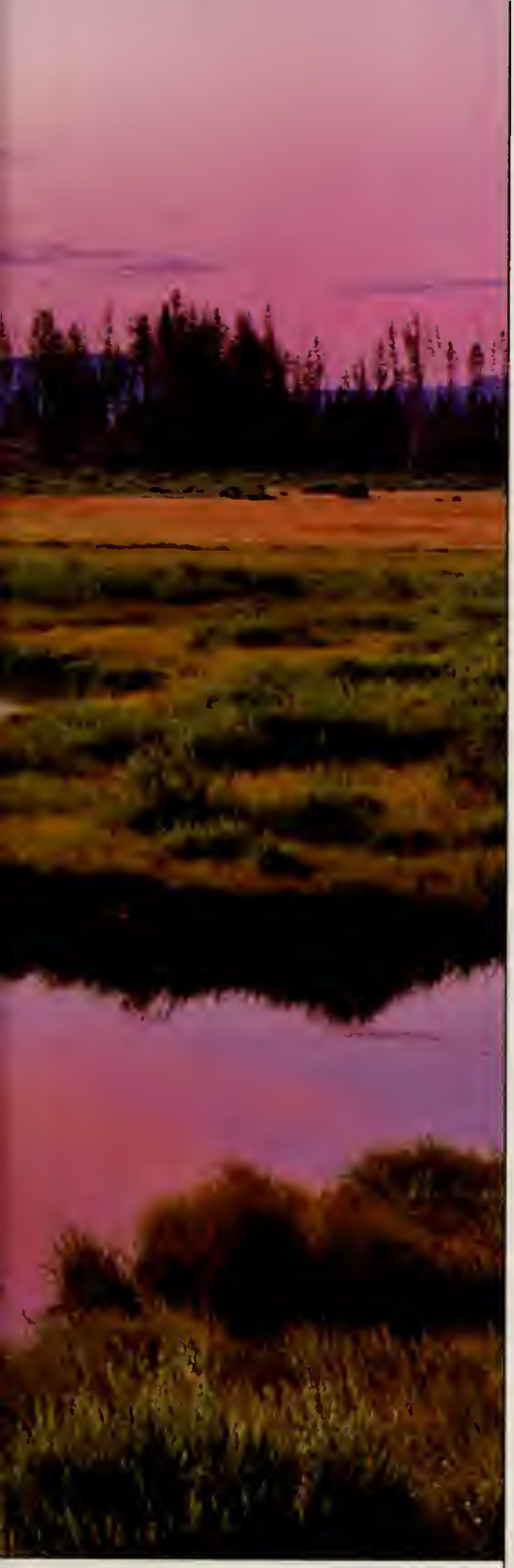
***MONTANA OUTDOORS* STAFF**
Tom Dickson, Editor
Luke Duran, Art Director
Debbie Sternberg, Circulation Manager

***MONTANA OUTDOORS* MAGAZINE**
VOLUME 40, NUMBER 3
For address changes or other subscription information call
800-678-6668

Montana Outdoors (ISSN 0027-0016) is published bimonthly by Montana Fish, Wildlife & Parks. Subscription rates are $9 for one year, $16 for two years, and $22 for three years. (Please add $3 per year for Canadian subscriptions. All other foreign subscriptions, airmail only, are $35 for one year.) Individual copies and back issues cost $3.50 each (includes postage). Although *Montana Outdoors* is copyrighted, permission to reprint articles is available by writing our office or phoning us at (406) 495-3257. All correspondence should be addressed to: *Montana Outdoors*, Montana Fish, Wildlife & Parks, 930 West Custer Avenue, P.O. Box 200701, Helena, MT 59620-0701. E-mail us at montanaoutdoors@mt.gov. Our website address is fwp.mt.gov/mtoutdoors.

© 2009, Montana Fish, Wildlife & Parks. All rights reserved.

Postmaster: Send address changes to *Montana Outdoors*, Montana Fish, Wildlife & Parks, 930 West Custer Avenue, P.O. Box 200701, Helena, MT 59620-0701. Preferred periodicals postage paid at Helena, MT 59620, and additional mailing offices.



FISHING THE GLASS Duck Creek, near West Yellowstone, is the type of slow, spring-fed stream where miniscule dry flies are the rule. Learn how to fish these glassy waters on page 8. Photo by John Juracek.

FRONT COVER A cutthroat trout lunges for a tiny mayfly. Photo by Terri Reese.

Montana Outdoors

MAY–JUNE 2009

FEATURES

8 Small Flies for Big Trout You'd think large fish would eat only large flies. But on many Montana streams and rivers, it doesn't work that way. *By Neale Streeks*

14 Keeping an Eye on Mountain Trout Lakes Each summer, FWP fisheries workers head into the backcountry to monitor high-elevation fishing waters. *By Bob Gibson*

16 Precious Metals, Precious Trout Can Montana continue extracting the one without harming the other? *By Tom Dickson*

24 Let's Go Catch Some Fish! A basic guide to taking kids fishing (for adults who don't have a clue). *By Dave Hagengruber*

24 Kids Fishing

30 Growing a Bird Garden Landscape with native plants to create habitat that attracts a wide variety of bird species. *By Craig and Liz Larcom*

36 Monitoring Montana's Moving Water With measuring tools ranging from old-fashioned yardsticks to high-tech Doppler radar, streamgagers keep a close watch on potentially dangerous rivers. *By Becky Lomax*

DEPARTMENTS

2 LETTERS

3 OUR POINT OF VIEW Bridge Access Bill Is Worth Celebrating

3 NATURAL WONDERS

4 OUTDOORS REPORT

6 SNAPSHOT

41 OUTDOORS PORTRAIT Iowa Darter

42 PARTING SHOT Highway Hatch

Melting anyway

Regarding your article on climate change ("Feeling the Heat," March–April): When will people realize that Grinnell Glacier is a remnant of a long-ago ice age? At some point all glaciers will disappear unless we trend toward a new ice age. I'm curious what the latest statistics reveal. All you hear about is information before 2007, when sun spot activity and other earth cycles were at their highest.

Dave Klette
Dutton

Crowding not a problem

Your article "A Boom in a Silent Sport," (September–October 2008) uses selectively chosen data to support a false perception of archery elk hunting in the Missouri River Breaks. FWP continues to promote the idea that the number of archery elk hunters in the Breaks has grown to unmanageable proportions. The reality is that the number of archery elk hunters in the Breaks has been steadily declining since 2005—with approximately 750 fewer hunters in 2008 than in 2005. Only about 12 percent of archery hunters statewide apply for permits in the Breaks.

The reader is led to believe that nonresident archery elk hunters have unlimited opportunity. The reality is that nonresident elk hunters are limited by a statewide cap of 17,500 elk licenses, set by the legislature. In addition, a nonresident must first purchase an elk license before applying for the limited permit to archery hunt in the Breaks. According to FWP data, less than 30 percent of the hunters in the Breaks have been nonresidents.

FWP cites "more overcrowding, less access, and reduced equity between archery and rifle

hunters" as reasons for adopting the limited permits. Attempting to control these social issues by limiting hunting opportunity will bring about the demise of hunting as we have known it in Montana. The reality is that overall public comment did not support adopting these regulations, and they will in no way increase access to private land. As for equity between archery and rifle hunters, rifle hunters are almost always limited to prevent overharvest of game. If a rifle hunter wants to have more hunting opportunity, pick up a bow.

Elk populations in Montana have gone from 50,000 elk in 1978 to over 150,000 in 2008. In limiting the Breaks, FWP appears to be more concerned with providing a special trophy opportunity rather than overall hunting opportunity. Limiting districts in the Breaks and not statewide will create a trophy hunting area at the expense of the hunter who just wants the opportunity to get out and hunt.

Mark Robbins
Armells Creek Outfitters, Roy

Quentin Kujala, FWP Wildlife Division's Management Bureau chief, replies: *Mr. Robbins is correct that the overall number of archery permits in the Missouri Breaks has declined over the past few years, though only slightly. But the number of statewide archery licenses sold has increased dramatically—from 26,276 in 1998 to 40,314 in 2008—so there definitely is an upward trend overall in archery hunting. And archery hunters in the Breaks and elsewhere tell us they are finding less private land open to public hunting—thus increasing the number of hunters on remaining public and private parcels and contributing to overcrowding.*

FWP is also concerned about equity. For years, bowhunters across the United States knew they could come to the Missouri Breaks and hunt trophy bull elk in areas highly restricted to rifle hunters. The archery bull harvest in some Breaks hunting districts has actually been higher than the rifle bull harvest. The new regulations will make archery hunter access to trophy bulls consistent with how FWP allocates opportunity to rifle hunters.

Some people have denounced the new regulations in the Breaks, especially those who have lost hunting opportunities or income from outfitting. But other archery and rifle hunters support the new regulations. The department and the FWP Commission will continue to evaluate archery regulations in the Breaks and consider the concerns of hunters and landowners as well as the well-being of the elk herd.

Woodpecker on steroids?

In Rick Bass's essay (March–April), he writes that pileated woodpeckers are 3 feet long. They are in fact less than half that—16.5 inches from bill to tail tip—about the size of a crow, not a turkey vulture.

Jerry C. Shively
Thompson Falls

Rick Bass replies: *They sure look 3 feet long when they are all stretched out. And the bill! Maybe they make them bigger here in the Yaak Valley.*

Texas pride

I recently read an article from a 2007 issue of *Montana Outdoors* while at the VA Hospital in Amarillo, Texas, with my dad. The article mentioned a couple from Early, Texas who were arrested for poaching in your state. To the people of Montana, I, as a Texan, apologize for their ignorant and greedy actions. I know what they say about first impressions, but I can only hope that I have the opportunity to come to your great state and show you that not all Texans are like those two slobs. And my congratulations to the game wardens for doing some superb detective work.

Rick Londagin
Stinnett, TX

TOM DICKSON

"I still pray for guidance, but it's good to have GPS for backup."

Bridge access bill is worth celebrating

ISTOCKPHOTO.COM

An important bill that protects two of Montana's most cherished values—public stream access and private property rights—was passed overwhelmingly in April by the 2009 legislature and signed into law by Governor Brian Schweitzer. The new bridge access law is great news for landowners, anglers, and all Montanans who are encouraged to see lawmakers work together to solve a seemingly intractable problem.

The problem had to do with fences attached to bridges crossing streams. Under Montana's 1985 Stream Access Law, streams are public on both banks up to the high-water mark. In other words, that's the public river right-of-way. And because a public road right-of-way extends along a bridge, an angler may legally access streams from bridges. A Montana attorney general's ruling in 2000 asserted the legality of that access.

Some landowners have restricted angler access by connecting impassible fences to bridge aburments. Their argument, that livestock should be kept from wandering into the road, is sensible, but the abutment fencing may be illegal. And it definitely creates difficulties for anglers who want to legally access a stream from a bridge.

Several lawmakers tried to address the issue in the 2005 and 2007 sessions, but their bills were unsuccessful. In 2007 Representative Mike Milburn (R-Cascade), who headed the House committee where a bridge access bill died, directed anglers, stockgrowers, counties, and other parties to work together over the next two years to develop a proposal that would address both access and livestock containment.

A group representing those interests accepted the challenge and hammered out a proposal. They took it to Representative Kendall Van Dyk (D-Billings), who this year introduced a bill that would make it legal for landowners to attach fencing to bridge abutments while making it easier for people to gain river access at those spots with a gate, stile, walk-over, roller, or similar passage. The concept is pretty simple: Yes, landowners can attach a fence to a bridge, as long as the fence is modified to allow fishermen to get through to the river. The bill also protects landowners from liability if someone gets hurt while accessing a stream using the public right-of-way. FWP will have primary oversight of the public passage mechanisms and pay for necessary modifications. We are committed to working with all landowners and recreationists who contact us for assistance in modifying fences to allow access.

The Montana Cattlemen's Association, the Montana Farm Bureau, Trout Unlimited, the Montana Wildlife Federation, and many other groups supported the bill, as did lawmakers on both sides of the aisle. The bill passed the House 97 to 3 and the Senate 48 to 2.

The new law is one to celebrate. It's an important nonpartisan agreement in which both sides benefit. People struggling with a contentious issue did the hard work of meeting, talking, and listening, and then together they crafted a compromise that works for everyone. The bill demonstrates what can be accomplished when people make a good-faith effort to reach middle ground.

FWP thanks everyone who worked so hard on this compromise, which is good for the public and for the private landowner. And I'd like to remind anglers that while they are exercising their right to access Montana waterways from bridges, they need to stay within the high-water mark and not cross private property without permission.

—Joe Maurier, *Director, Montana FWP*

NATURAL WONDERS

ILLUSTRATION BY PETER GROSSHAUSER

Q. ***Near our cabin is a stand of aspen where we often hear a ruffed grouse drumming in the spring. How does he make that noise, and what is the purpose?***

A. Throughout the year, but primarily during the spring mating season, a male ruffed grouse will stand on a downed tree, which biologists call a "drumming log," and beat its wings rapidly in five- to eight-second intervals. As the wings compress the air, they create a vacuum that produces a thumping noise, which sounds like a distant lawn mower. This drumming is meant to attract females and warn other males to stay away.

Q. ***Friends from out of state are coming to visit this summer. When does the Going-to-the-Sun Road in Glacier National Park traditionally open?***

A. According to the National Park Service, the world-famous scenic route has fully opened anywhere from late May to late June over the past 35 years, with the average date roughly June 10. For up-to-date conditions, visit: home.nps.gov/applications/glac/roadstatus/roadstatus.cfm.

DUSAN SMETANA

Self-confidence in the outdoors

Women interested in learning how to cast a fly, shoot a gun, build a survival shelter, and perform other outdoors skills are invited to attend the 16th annual Becoming an Outdoors-Woman (BOW) Workshop July 31–August 2 at the Birch Creek Outdoor Education Center. Coordinated by Montana FWP, the workshop will provide hands-on classes on subjects ranging from using a map and compass to navigating a ropes course. The $200 fee includes instruction, meals, and lodging at the camp, located between Butte and Dillon in the Pioneer Mountains. Though rustic, the lodging includes indoor restrooms and hot showers.

The BOW Program was created to allow women from all backgrounds to learn outdoors activities and skills with other women in a supportive atmosphere. Over the past 15 years, more than 1,000 women have attended the Montana workshops. "I hear again and again from participants that they gain satisfaction and self-confidence in learning outdoors skills," says Liz Lodman, who coordinates the BOW Program for FWP. "Just like men, women want to learn the correct way to handle a firearm or cast a fly rod. We want to know the right way to build a fire, how to set up a tent, and what to look for when buying outdoors equipment."

The workshop is designed for women but is open to anyone age 18 and older who wants to learn the basics of camping, fishing, shooting, and outdoors survival. Register by visiting the FWP website at fwp.mt.gov and looking under "Education." Or contact Lodman at FWP-BOW, P.O. Box 200701, Helena, MT 59620; (406) 444-2615; or llodman@mt.gov.

Derogatory names changed in 76 places

More than 150 American Indians and whites gathered at the Montana State Capitol Rotunda in March to celebrate the state's removal of the derogatory word "squaw" from the names of 76 streams, buttes, and mountains across the state.

"We celebrate 76 old places and 76 new names," said Jennifer Perez Cole, Indian affairs coordinator for Governor Brian Schweitzer. "This derogatory word 'squaw' was a word used by white men to describe Indian women. We sent a message in 1999 that it was unacceptable."

Montana is the second state to undertake a statewide review of place names containing the offensive term; Minnesota was the first. Most of the name changes from the decade-long project are official, although a few are still working their way through the revision process.

"This law will go a long way in healing these past wrongs," said Senator Carol Juneau, Browning, who as a state representative sponsored the 1999 law approving the name-change project. "With these name changes, we've made Montana a better place."

Juneau said she expected the project would be done in a few years. But it wound up taking a decade for the all-volunteer members of the project committee to work with tribal, national, state, and local governments. In addition, the group found far more names than anticipated that required changing.

The first name change was in the Helena area, when Squaw Gulch was renamed Wakina Sky Gulch. (Wakina is a Pacific Coast Indian word meaning "red sky in the morning.") Stands Alone Woman Peak, a rock formation in Glacier National Park, replaces Old Squaw Peak. A stream flowing through Gallatin County has become Castle Creek instead of Squaw Creek.

At the colorful ceremony in the capitol, Little Shell Cree Tribe elder Henry Anderson burned tobacco before offering

In 1999, the American Fisheries Society changed the name of the northern squawfish to the northern pikeminnow. Recently, Montana completed a ten-year project to change the names of 76 buttes, streams, and other places containing the derogatory term.

JEREMIE HOLLMAN

the opening prayer. Rhythmic beats echoed in the rotunda from an Indian drum circle throughout the celebration.

Representative Diane Sands of Missoula, who introduced the first name change bill in 1997 but was unable to get it passed, noted that "words do have meaning, and they can cause pain."

FWP offers family special at L&C Caverns State Park

With the economy in the doldrums, many budget-minded families are looking for bargains when they plan weekend outings. That's why FWP is offering

See the caverns in a new light and at a bargain price for families this June.

CHERYL AL-HADI

a great deal on one of Montana's premier state park attractions. During June, a family of four can take a guided tour of Lewis and Clark Caverns for only $20. The deal is good for any family of up to two adults and two children. (Fees for additional visitors are the regular rate of $10 per adult, $5 for kids age six through eleven, and free for kids under six.) That's a savings of up to 50 percent.

"We know times are tight, and we want to make the caverns tour affordable for as many families as possible, especially Montana families," says Chas Van Genderen, chief of the FWP Parks Division. "We'd like to offer the special all summer long, but July and August are already busy at the caverns. Because we are fully staffed in June, we can handle more visitors than we usually get at that time of year." June is a great month to visit the state park because summer crowds have not arrived and temperatures are milder than in July and August.

A new feature in the park is a modern LED lighting system that was installed in the lower part of the caverns in 2007. "It's really something to see all the purples and pinks in the formations with the new lighting," Van Genderen says. He adds that the park also has several new above-ground hiking trails that offer views of the Jefferson River valley, wildflowers, and wildlife.

Lewis and Clark Caverns, located south of I-90 between Butte and Bozeman, is Montana's only state park that charges a service fee other than for camping. All other state parks are free for day use for Montanans because they pay a fee on license plate registrations.

To take advantage of the June family special—available only in 2009—get a discount coupon at the FWP website, fwp.mt.gov/parks. For more information, call the park at (406) 287-3541 or the Parks Division in Helena at (406) 444-3750.

LARRY ALTEMUS

Mike Runyan (left) of Florida with hunting companions and his 192⅜-point ram taken in 2008 in northwestern Montana.

Montana poised to break world bighorn record

Montana may not claim the nation's largest elk, moose, mule deer, or white-tailed deer. But new evidence appears to give the state boasting rights as "Biggest Bighorn Country."

Recent analysis by FWP suggests that a minimum of 110 bighorn rams harvested in Montana over the past three years could score at least 180 points, the minimum qualification for the Boone and Crockett record book. "It's remarkable that during those three years, we only gave out about 475 sheep permits. That means more than 20 percent of the harvested rams could be Boone and Crockett caliber," says Ken McDonald, chief of the FWP Wildlife Division.

Last fall hunters took some particularly large sheep with scores of 193, 195 (three rams), 202, and 204. The two rams over 200 points—what sheep hunters consider the threshold for an exceptional trophy—were taken in the Missouri River Breaks, considered one of the best sheep hunting regions in North America. Points are given for a combination of length and circumference at various places on the horns. Montana's state record ram is 204 ⅞ points. The world record, shot in Alberta in 2000, scored 208 ⅜ points.

"Considering the number of big rams we've been seeing here, there's a good chance a hunter in Montana will break the world record in the next few years,"

> "There's a good chance a hunter in Montana will break the world record in the next few years."

says McDonald.

Since 1986, Montana has advertised its potential for trophy rams at the Foundation for North American Wild Sheep annual convention. Each spring, FWP auctions one sheep license at the event to raise money for state sheep management programs. Over the past 23 years, the auction has raised $3.2 million, with 90 percent allocated to sheep management.

Denver Bryan photographed this drake mallard last spring at a marsh behind his house in Bozeman: "I was playing around with a slow shutter speed, doing some experimenting. With this mallard, I took dozens of shots at around 1/8th of a second using the panning technique, where you follow the bird with your camera as you're

shooting. It produced this wonderful blur motion, accentuating some of the colors in the wing that ordinarily get hidden. And that reddish color you see in the background is actually red-osier dogwood. The image also has a great dreamy feel that I like a lot. This is one of my favorite photos of all the ones I took last year." ■

RAINBOW TROUT FEEDING TO MIDGES ON THE BIGHORN RIVER BY BARRY AND CATHY BECK

JOSHUABERGAN.COM

SMALL FLIES FOR BIG TROUT

You'd think large fish would eat only large flies. But on many Montana streams and rivers, it doesn't work that way.

BY NEALE STREEKS

It's late July on the Missouri River. The river is low this time of year, and the current glides over lush weed beds. The brilliant midmorning sun illuminates both the riverbed and several large trout hovering in the slow water near shore. The fish rise again and again to countless tiny mayflies floating on the water's surface. Hundreds of thousands of these aquatic insects, of the genus *Tricorythodes*, dance in the air above, forming small clouds over the river. After repeated casts, an angler's tiny Trico dry fly is finally sipped off the surface by a particularly massive, slow-rising trout. The hooked fish surges into the depths. The fly reel spins. After much shouting and excitement, a landing net is slipped into the water. Once again, as happens often on this and several other famous rivers and streams across western Montana, the old adage "big flies for big fish" is proved wrong. >>

TRICO TORNADO A common tiny mayfly is the *Tricorythodes*, or Trico. Starting in midsummer, these insects hatch in enormous numbers on many slow, slick streams and rivers. Trout set up in feeding lanes where thousands of Tricos float overhead. An angler's task is to use stealth and accurate casts to trick a trout into taking an imitation rather than the real thing.

JOHN JURACEK

STEAK AND PEANUTS

Trout survive primarily by eating various life stages of aquatic insects. Anglers catch trout by using flies that mimic the different stages: larvae and pupae (imitated by flies generally known as nymphs), emerging adults (flies known as emergers), adults drifting on the surface ready to take flight (duns), and dead adults floating on the water surface (spinners).

Some aquatic insects, such as salmonflies and golden stoneflies, are as large as your thumb. These big bugs require rocky-bottomed rivers and the highly oxygenated water found only in rapids and riffles. At certain times of the year, trout readily take flies imitating these big bugs—the trout's equivalent of a 32-ounce ribeye. Anglers love these hatches. The flies are easy to see, and presentations don't have to be delicate or accurate. In fact, the angler isn't casting to visible trout, but to banks or boulders where fish might lurk. Trout lunge at artificials such as the Madame X or Sofa Pillow like it's the last insect they'll ever see. The strikes can be savage, because the water is moving so fast a trout has to rush at the fly to catch it.

It's a fun way to fish, no question. But it doesn't last long. These extra-large insects hatch only in fast water, such as the Gallatin and the Madison, and only for a few weeks each year at the end of high water runoff in late spring or early summer. By early July, the big-fly action is ending. Then a completely different type of dry fly fishing begins on certain Montana waters.

I'm talking about the slow tailwater fisheries below dams on rivers such as the Missouri and the Bighorn, as well as the larger spring creeks such as Nelsons and Armstrong. On these waters, rapids are rare, current is slow, and the surface is slick. Lacking a rocky substrate as well as the rapids that mix air into the water, these rivers also lack larger aquatic insects. Instead, their fertile waters produce enormous amounts of smaller bugs such as midges, mayflies, and caddis flies. And for much of the summer, big trout lie in plain sight sipping the tiny insects

If big flies are like steaks, tiny flies are like peanuts. Though they are still packed with protein, a fish needs to eat many more to stay full. The good news for an angler is that trout eating tiny flies are constantly rising to the surface. The bad news it that fooling these trout—especially big ones over 20 inches—can be extremely difficult.

> During a hatch in slow, slick waters, a trout doesn't need to move more than an inch or two to take a fly off the surface.

NO NEED TO MOVE

Spring creeks and tailwater fisheries are extremely fertile and hold enormous insect populations. After hatching, the insects collect in eddies and other slow water, which can become nearly blanketed with bugs. Trout here have learned they don't need to rush after their food: A steady supply is floating overhead as if on a conveyor belt. These fish are observant and deliberate. They have time to look over your fly in the slow flow. That means your fly has to be as tiny as the insect it mimics, and you must employ hair-thin leaders, accurate casts, and stealth.

During a hatch in slow, slick waters, a trout doesn't need to move more than an inch or two to take a fly off the surface. It finds a spot where it can grab the most food possible with the least effort fighting the current. Like all creatures, trout survive and grow only by consuming more calories than they expend.

The biggest steadily rising trout tend to be in the slowest current. And the slowest currents are usually along the bank. That's why so many of the big fish I find for my clients are in less than 12 inches of water, just a few feet from shore. Other spots to look for big trout are flats, eddies, and the slow water along inside bends.

These zones may not have the boulders, logs, shade, or overhead cover that hold trout in fast streams. So what do they offer? A life of leisure. All insects coming from upstream are compressed into a shallow water column just a few inches deep. A fat trout can fin near

---

Neale Streeks is a Missouri River fishing guide and the author of several fly-fishing books, including Small Fly Adventures in the West. *He lives in Great Falls.*

the bottom without wasting energy, rise a few inches through the slow current with minimal effort, slurp a bug, and sink back down. It's like sitting on the couch with bowls of corn chips, M&Ms, and buffalo wings all within arm's reach.

Experienced anglers recognize these shallow zones. But beginners splash right through the skinny water, spooking one big fish after another. They assume the lunkers must be deep, never realizing they are standing right where a 20-incher was swimming moments earlier.

THE RHYTHMIC RISE

To further minimize physical effort, big trout rise to surface insects in a rhythmic pattern, their head and shoulders porpoising or just their snout bobbing at the surface. This feeding pattern is like a hiker's steady gait. By walking at a constant pace, hikers can travel for hours. But if they stop and start and change speed, the trip is more tiring.

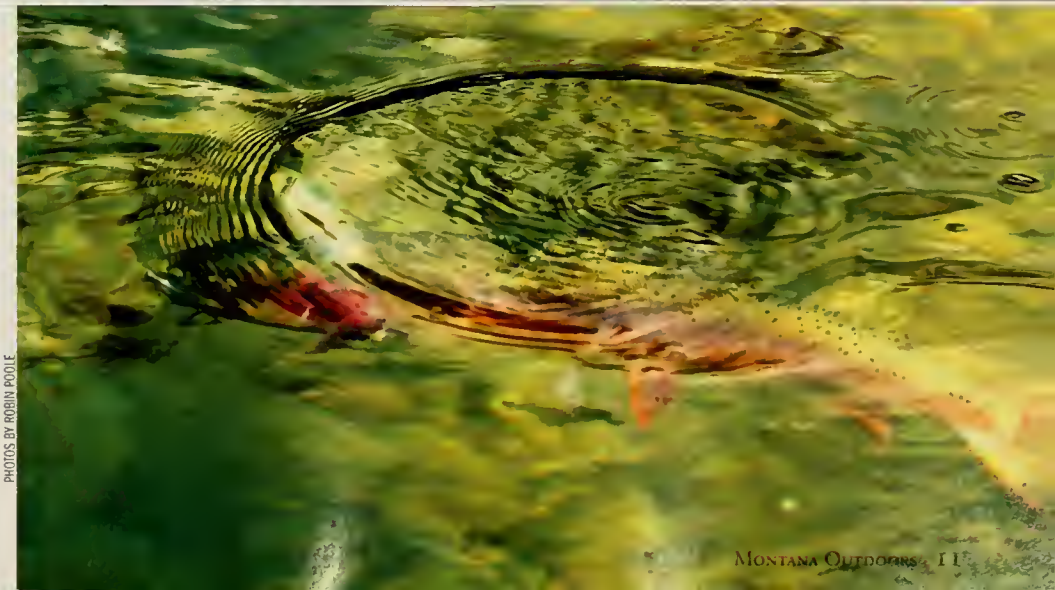
A trout rises in a rhythmic pattern only when the water surface is covered with insects. It doesn't even need to see a particular insect on the water. It learns that with each rise, a bug will be next to its nose.

Beginners assume these steadily surfacing trout will be easy to catch. After all, the fish are rising like clockwork. But in fact the opposite is true. A trout feeding rhythmically to tiny insects may be focusing on a 4-inch-wide feeding lane in front of its nose. That means you have to cast repeatedly, make exact presentations, and use the most realistic fly pattern possible. Skilled casters commonly place a fly perfectly over a trout a dozen or more times before the fish finally takes it.

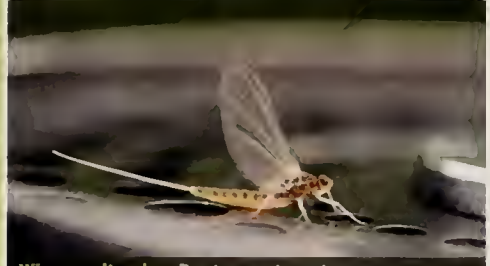
And often the take is just luck. The fish doesn't "go after" the imitation. It just happens to rise and open its mouth the moment the fly arrives.

This type of fishing can be infuriating for some anglers. Either they don't use the correct imitation, don't make a perfect presentation, or they spook the trout. It's incredibly easy to scare a shallow-water trout. The fish dash for deep water when they see a person nearby, feel the wake of a wading angler

WHY NOT A STEAK? The cutthroat in this series was rising to tiny mayflies. In such conditions, trout often ignore big grasshopper or stonefly imitations, behavior that can baffle an angler. After all, if a trout needs as much protein as possible to survive, why doesn't a "steak" trump a "peanut"? One theory is that trout feeding heavily on tiny flies become fixated on those particular insects. They fall into a mental "rhythm" that matches their physical rising pattern and no longer associate big flies with food. The way to catch these selective fish is to match the hatch and time your cast so your imitation drifts over the fish's nose and intercepts the trout exactly when it rises.



PHOTOS BY ROBIN POOLE



Western olive dun *Baetis punctiventris*

WHICH TINY FLY TO TIE? When a tailwater or spring creek is blanketed in insects, there's a good chance that *Baetis*, PMDs, and Tricos are among the mix. Shown here are imitations of those tiny bugs. The author recommends these and other imitations in sizes 18 down to 24.

Western pale morning dun *Ephemerella inermis*

Trico or pale olive dun *Tricorythodes minutus*

PHOTOS BY JOHN JURACEK

or a boat, or encounter silt from someone wading upstream. And there's more: A fly that lands too hard and too close will scare a trout, as will fly drag, repeated presentations of an unnatural-looking fly, and the "grease halo" of a dry fly that has been freshly treated with floatant.

UP OR DOWN?

Before you can attend to any of those concerns, however, you need to decide whether you want to cast upstream or downstream to a rising fish. Both approaches can work equally well, but each requires a different technique. The upstream caster comes up from below (downstream of) the fish, moving slowly and quietly to get close. Because the trout is facing upstream, it can't see the angler. The trick here is to cast with a very light leader—from 5X to 7X—and put the fly 1 to 2 feet upstream of the fish. It's easy to spook a trout from this position if it sees your line and leader repeatedly flying overhead while you false cast. I false cast rapidly off to the side, keeping my rod low to the water. Then, as the trout rises, I zip my cast to a spot upstream of the fish.

This accomplishes several things. The fish is less likely to be spooked by my presentation because it's now looking through the water "rings" caused by its recent rise. Also, as my fly and leader land, the fish is tipping its head down toward the bottom. A trout moves in the water column by tilting its body slightly up or down and letting the current raise or lower it like wind on an airplane wing. By the time the fish has refocused on the surface and has angled up in its pattern to take the next mouthful, my fly has had time to float to the exact location of the next rise. At least that's the theory.

Getting above that same fish and casting downstream requires a different strategy. First of all, I don't cast directly downstream but down and across at about 45 degrees. As the fly is about to land, I cock my wrist to bring the rod tip back and create some slack in the line. Ideally, the fly lands 4 to 5 feet upstream of the trout—far enough so the fish can't see the fly, leader, and line hit the water. As the fly drifts downstream, I shake out line from my rod to get the longest drift possible. This keeps the fly downstream of the leader, so the trout sees the fly first and isn't spooked by the leader. The longer drift also means I won't drag my fly over the fish. Finally, I make sure the fly drifts about an inch to my side of the trout, further decreasing the chance it is spooked by the leader.

I've found that the downstream cast works best when I'm wading broad, shallow flats, or when I'm casting from an anchored boat to trout hugging the bank.

ON THE PROWL

Serious fly-fishers know the major species of tiny bugs, as well as when and where they appear. You'll hear hushed talk like, "I'm gonna hit the *Baetis* hatch on the 'Horn"; "The Tricos are thick on the Mo"; and "They're sipping midges over on Nelsons."

Get in on the action by reading fishing articles, websites, and blogs. Call fly shops. Find out which bugs, patterns, and sizes are working best at the moment, and what times the hatches begin and end (sometimes that changes daily). You don't need a huge supply of patterns. I catch most of my rising fish on roughly a half-dozen: midges, Parachute Baetis, Parachute Adams, Pale Morning Duns (PMDs), PMD Spinners, smaller caddis imitations, and Parachute Double Tricos—in sizes 18 down to 24.

Fishing to trout in the conditions described here is similar to hunting. You can't just wade out into the river and start casting. You have to prowl around and search for rising fish. That means stealthily walking the bank while scanning for riseforms, or drifting quietly while scanning ahead for rising fish. Examine every eddy, flat, and bankside shallows until you spot a large feeding trout. You now have a better idea of why that fish is there, what it's doing, and how to deliver your tiny dry fly into its white gaping mouth.

NO STONEFLIES HERE Spring creeks and tailw
don't produce many big aquatic insects. Sa
wood leaves that fall into the water. Golden
eat microscopic zooplankton. The upshot? I

produce more pounds per acre of insect life than houldery rivers that tumble down from mountains. But spring creeks and tailwaters
flies need water oxygenated by rapids and require big underwater rocks where they can stay out of the current while feeding on cotton-
eflies have evolved to crawl around rocks to hunt for other aquatic insects. Slower, slicker waters contain mostly smaller insects that
w, slick waters, use tiny flies and hair-thin tippets, hunt for rising trout along the bank, and cast delicately—and repeatedly.

Keeping an Eye on Mountain Trout Lakes

Each summer, FWP fisheries workers head into the backcountry to monitor high-elevation fishing waters. BY BOB GIBSON

BRAD LOOKHART

MADE IT Mountain lakes can be tough to reac while. Recently, FWP began putting on-line its Absarokas, Beartooths, and Crazies. For eac abundance, stocking history (where applicabl

While Montana's trout rivers are famous worldwide, the state's mountain trout lakes receive little notice in major sporting publications. And that's just fine by the local anglers who have long enjoyed the more than 1,000 high-elevation lakes that support trout fisheries.

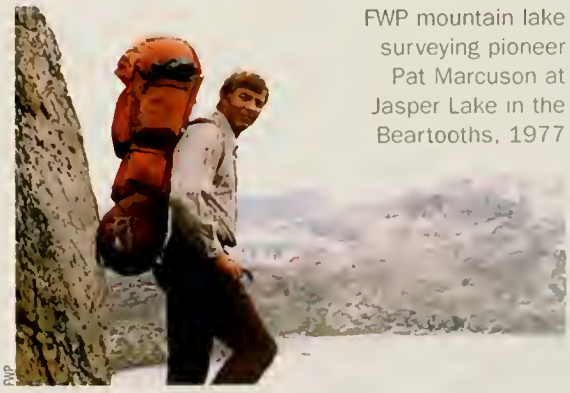
Recently, Montana Fish, Wildlife & Parks' south-central region made it easier to locate the 340 trout lakes in the Abasaroka-Beartooth ranges and the Crazy Mountains. An annually updated version of the region's guide to mountain lakes in the Absarokas, Beartooths, and Crazies has been on-line for several years. Since 2008, it has included GPS coordinates to help anglers pinpoint lake locations. In addition, the guide provides details on fish species in each lake, fish abundance, stocking schedules, nearest trailhead, and firewood and campsite availability, and includes observations from FWP fisheries staff managing the waters.

FWP has been keeping close tabs on south-central Montana mountain lakes for more than four decades. In 1967, fisheries biologist Pat Marcuson began taking meticulous notes on the lakes. Every year since, biologists and fisheries technicians have updated the information. Eventually they worked it into an ever-expanding electronic database, which has become the most complete and detailed record of mountain trout lakes in the country.

Marcuson, who is retired and now lives in Salmon, Idaho, says mountain lakes in the Beartooths received little attention from fisheries biologists before he began his surveys. Most information about fish populations came from game wardens who occasionally fished the lakes during backcountry patrols. Starting in the early 1960s, Marcuson says, people began hauling fish between mountain lakes in buckets to increase high-country fishing opportunities. Unfortunately, non-native brook trout often were dumped into lakes where they squeezed cutthroats and other native species out of historical habitat. The non-native fish problem was compounded when the state tried to plant fish in the lakes with airplanes. Pilots—many of them contracted—were unable to tell one lake from another and frequently dumped hatchery rainbow trout into lakes containing native cutthroats.

In 1967, officials with Montana Fish and Game, as the department was then known, decided it needed to do a better job managing mountain lakes. That summer, the department hired temporary employees to help Marcuson survey south-central Montana lakes. The crews carried 125-foot-long gill nets and a 100-pound inflatable boat into the wilderness and conducted fish surveys on 20 lakes. In later years, the surveyors became more efficient and were able to survey 50 or more lakes per summer.

When money got tight, the department eliminated the temporary positions. But Marcuson, committed to learning as much as possible about the mountain trout lakes, obtained funding from outside organizations, including the U.S. Forest Service. In exchange for USFS dollars, federal officials required that the surveys also include information about camping opportunities and the number of campfire rings at each lake. That information was added to Marcuson's report and remains there today, even though backpacking stoves now are considered more environmentally friendly than campfires in wilderness areas.



FWP

FWP mountain lake surveying pioneer Pat Marcuson at Jasper Lake in the Beartooths, 1977

The information was first available to the public when Falcon Press asked Marcuson to write a book about the best fishing spots in the Absaroka-Beartooths. Marcuson was concerned that the commercial book would list only the best fishing spots and endanger lakes by concentrating visitors in just a few places. To spread

Bob Gibson manages the FWP Regional Information and Education Program in Billings.

hut the excellent fishing makes the effort worth-
nually updated guide to mountain lakes in the
f the 340 lakes, the site lists fish species, fish
GPS coordinates, and other information.

out fishing pressure, he convinced the publisher to produce a comprehensive guide that listed every lake. The result was Marcuson's *Fishing the Beartooths.* The latest edition was printed in 1997 and is still available ar many booksellers as well as at Amazon.com and other on-line sources.

Also on-line is FWP's annual edition of *Mountain Lakes Guide: Absaroka, Beartooth, and Crazy Mountains.* This guide can be viewed on and downloaded from the FWP website (http://fwp.mt.gov/r5/mountainlakes.html.) The department also has a limited number of printed editions at the regional FWP office in Billings. For informarion on mountain lakes in other parts of Montana, visit fwp.mt.gov, click "Fishing" and then "Fish Stocking Info."

Every summer, FWP biologists and technicians continue to cover hundreds of miles of rugged trails in the Absaroka-Beartooth ranges and the Crazy Mountains to update the guide and recommend planting schedules and management priorities. Every year for the past two decades, FWP biologist Mike Vaughn has updated the guide, while fisheries technician Earl Radonski has managed the backcountry surveys and helped analyze and publish the data.

PHOTOS BY BOB GIBSON/FWP

TROUT ABOVE THE CLOUDS Above left: West Whitefish Creek Lake Number 43, in the Beartooth Range, sustains a healthy population of golden trout. The 4-acre lake sees few anglers because of the steep, difficult access. Above right: Fisheries technician Earl Radonski (far right) leads the FWP mountain lakes survey crew in 2006.

Radonski says the lake fisheries in the Beartooths generally fall into two categories: self-susraining and stocked. Self-sustaining lakes have enough spawning habitat to allow fish to restock themselves year after year. "These often contain so many fish that while fishing can be fast, the average size will be small," Radonski says. "Average sizes and numbers of fish present change very little from year to year in most of these lakes."

FWP regularly stocks lakes that have little or no spawning habitat. The department stocks an average of 100 Yellowstone cutthroat fingerlings per acre every eight years. "In the first few years after planting, anglers find many small fish," says Radonski. "Then each year the fish will be larger but fewer in number." After seven to nine years, the fish die of old age. "Anglers use the stocking history in our guide to predict what sizes and numbers of fish a given lake mighr currently contain," he adds.

ADVENTURE CONSOLIDATED COPPER
Willow Creek Mining Company
INCORPORATED UNDER THE LAWS OF THE TERRITORY OF MONTANA
ROCKY MOUNTAIN REAL ESTATE CO.
National Mining and Tunnel
Eastern Montana Mining
LUKE DURAN / MONTANA OUTDOORS

PRECIOUS METALS

Can Montana continue extracting the one

In the Beaverhead-Deerlodge National Forest, about 15 miles west of Butte, runs a sparkling mountain trout stream that looks similar to scores of others like it flowing across western Montana. Known as German Gulch, the creek rises from Beal Mountain and flows north into Silver Bow Creek, a tributary of the Clark Fork River.

Over the past seven years, a short stretch of the stream has been restored by Trout Unlimited volunteers, assisted by state and federal agencies and local landowners, at a cost of more than $1 million in public grants and private donations.

By the time you read this, their efforts may have been washed away.

Upstream from German Gulch sits the residue of one of the most notorious mines in Montana's recent history. Since the mid-

MONTANA TREASURES In the late 19th century, miners received certificates certifying their claims to extract copper, silver, gold, and other precious metals from hardrock mines. These days, Montanans place increasing value on a different but no less valuable natural resource—mountain trout streams.

PRECIOUS TROUT

without harming the other?

BY TOM DICKSON

1990s, the now-abandoned Beal Mountain gold mine has been leaking cyanide and selenium, the latter a sulfur-like chemical element that can cause deformities in developing trout eggs. According to Jim Kuipers, a mining engineer in Butte who consults for conservation organizations, warm rains cascading off snowpack could cause the mine's leaching pond to overflow this spring, sending toxic water into German Gulch. That's not his only concern. "The leach pad sits on a fault line," Kuipers says. "We could someday see a massive failure in which the fault line shifts and sends thousands of tons of contaminated material downstream."

It wouldn't be the first time. In 1975, the Mike Horse Dam on the upper Blackfoot River blew out during a spring storm, killing nearly all brook and cutthroat trout for miles downstream and depressing fish numbers throughout the river system for decades. In 1996, after massive ice floes scoured the bed of the highly contaminated upper Clark Fork River and Milltown Reservoir, an estimated 44,000 tons of reservoir bottom sediment filled with copper and other metals was released with high water through Milltown Dam. The following summer, state biologists found that juvenile trout numbers had declined more than 70 percent from the previous year.

Mining creates jobs and wealth for many people in Montana and elsewhere. But it has

produced mounting problems for trout. Though the state now bans new cyanide heap-leach mines and requires reclamation bonds from mining operations, fisheries managers and trout advocates say the efforts fall short of what's needed to protect trout streams. As rising gold and other metal prices promise to spur mining activity, Montana faces a future where removal of one natural treasure threatens to impair another. "Clean water is a precious resource that we know can be sustained for generations," says Bruce Farling, executive director of Montana Trout Unlimited. "We're concerned that mineral mining regulations and laws—some of them more than a century old—are continuing to put that resource at risk."

STRIKING IT RICH

The Treasure State was built on precious minerals and metals excavated from underground (known as "hardrock" mining, compared with "softrock" mining for coal). The state's seal includes a pickaxe, shovel, and the words *Oro y Plata*, gold and silver. The first territorial capital, Bannack, was the site of a major gold rush, as was the eventual state capital, Helena. Butte and Anaconda would not exist today but for the rich copper veins in the granite below. Though much of the wealth produced by hardrock mines left Montana, the industry at one time created tens of thousands of union jobs.

Over the past century, more than 6,000 hardrock mines have operated in western Montana, from small streamside gold claims to the world's largest copper mine in Butte. Today, six large mines are in production along with several dozen small placer mines that dredge and wash a streambed or stream bank to expose trace elements of gold. Montana's hardrock mining industry currently employs roughly 2,600 people who extract gold, copper, platinum, palladium, zinc, and other metals used for jewelry, computers, telephones, solar energy cells, air and water quality devices, and medical procedures. According to the National Mining Association, mining operations extracted minerals worth more than $1.35 billion from beneath Montana in 2008. The state Bureau of Mines and Technology estimates that Montana mines since statehood have produced more than $150 billion in today's dollars, two-thirds of that from Butte, once known as "The Richest Hill on Earth."

Those vast riches have come with a price. The Montana Department of Environmental Quality (DEQ) says more than 300 of the state's 6,000 abandoned mining sites pose risks to human safety or health. Regionwide, the federal Environmental Protection Agency (EPA) estimates that 40 percent of headwater streams in the West are contaminated by mine waste. The most severe effects to trout come from "acid mine drainage," caused when sulfide-rich ore containing the mineral pyrite is exposed to oxygen and water. The chemical reaction produces sulfuric acid, which washes downstream from adits (mine tunnel openings) and piles of mined waste such as tailings (the sandlike remains of ore crushed in on-site mills to extract metals). Sulfuric acid in turn makes stream water more acidic, killing vegetation, aquatic insects that fish eat, and trout. Geochemists say a mine's acid drainage, typically visible as the orange-red, iron-rich water oozing from abandoned mines, can continue forever.

Acidic stream water also unbinds heavy metals such as lead, copper, cadmium, and zinc from organic material in mine tailings and waste rock. According to Montana Fish, Wildlife & Parks senior fisheries biologist Don Skaar, an expert on water pollution's effects on trout, dissolved metals disrupt gill function and make it harder for dissolved oxygen to pass into the bloodstream, causing the fish to suffocate. "In high concentrations, the metals can kill newly hatched trout and aquatic invertebrates in a matter of hours," Skaar says.

Eroding mines, roads, and tailings piles send sediment downstream, where it smothers trout eggs and underwater bugs. Placer mining digs up trout spawning beds and aquatic insect habitat. Skaar says many river systems also contain environmentally harmful levels of mercury that was used in 19th century mines to separate gold from tailings.

In cyanide heap-leach mines (no longer legal in Montana), piles of low-grade ore were doused with a cyanide solution. The liquid passed through the heap, dissolving miniscule traces of gold, eventually draining into a leach pond. There the solution was

ACID MINE DRAINAGE

At many abandoned mine sites, shaft openings, called adits, appear as inconspicuous holes in a hillside. These mine shafts and piles of mining waste expose pyrite-rich ore to oxygen and water. The chemical reaction produces sulfuric acid, which makes stream water highly acidic, killing aquatic life such as insects and trout. The acidic water also dissolves heavy metals such as lead and cadmium, which by disrupting gill function cause trout and insects to suffocate.

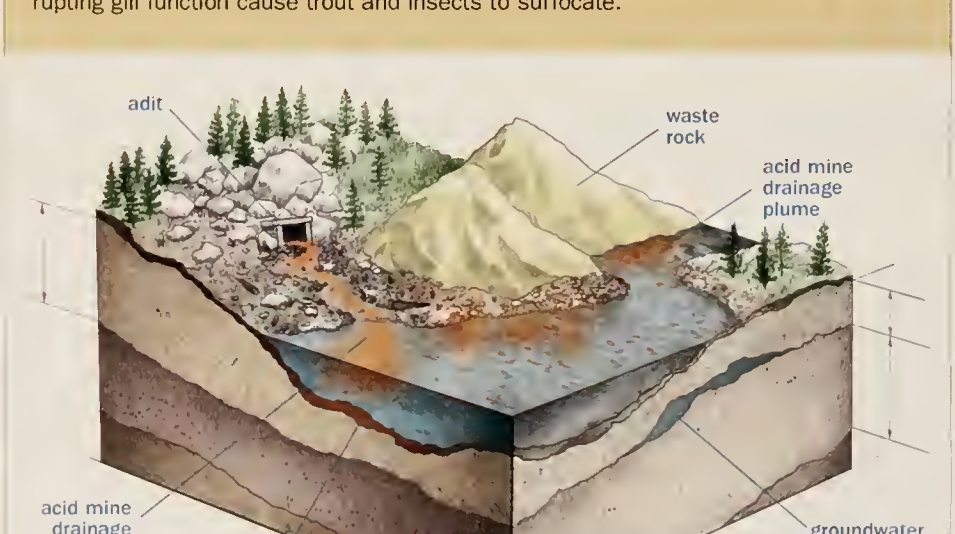


ILLUSTRATION BY BOB BREDEMEIER, COURTESY OF TROUT UNLIMITED

PHOTO BY ALAN BERGER. FROM HIS BOOK *RECLAIMING THE AMERICAN WEST*. PRINCETON ARCHITECTURAL PRESS: NEW YORK, 2002

PHOTOS BY PAT MUNDAY

REVERSE MIDAS TOUCH Beal Mountain Mine (above) near Butte opened in 1988. After extracting 460,000 ounces of gold (worth roughly $400 million at today's prices) over the next nine years, the company went bankrupt, leaving behind a 70-acre leach pond leaking cyanide and selenium. The pond, which is upstream from a trout stream, German Gulch, also sits on a fault line, making it vulnerable to seismic activity. The company's $6.3 million reclamation bond has covered only a portion of the estimated cost to treat the site. Below right: Trout Unlimited volunteers plant willow shoots on the banks of German Gulch as part of a $1 million restoration project. The scenic mountain stream (below left) contains a struggling but genetically unique population of westslope cutthroat trout (bottom left).

removed and treated to extract the metal. Plastic liners under old leach ponds can leak cyanide, and leftover mountains of crushed rock—50 tons or more to harvest each ounce of gold—can produce sulfuric acid.

COPPER BARREN

Nowhere have Montana trout had it worse than in Silver Bow Creek and the Clark Fork River downstream from the Butte and Anaconda copper mines and smelters. As early as 1891, the U.S. Fish Commission reported it "did not find any fish whatever" when netting the Clark Fork in the Deer Lodge area. A record flood in 1908 washed tons of mining waste contaminated with arsenic, lead, zinc, and copper farther downstream into the reservoir behind Milltown Dam near Missoula. In the early 1980s, the EPA designated four Superfund sites on the Clark Fork River system from the Berkeley Pit in Butte to Milltown Dam due to high levels of arsenic and metals posing risks to human and environmental health.

Another huge abandoned mine plaguing trout waters is the Mike Horse, located on Beartrap Creek, which flows into the upper Blackfoot River. The mine opened in the late 1880s and yielded tons of silver, zinc, and lead before closing in 1952. During a heavy June thunderstorm in 1975, the Mike Horse Dam burst and sent an estimated 100,000 tons of accumulated tailings laced with arsenic and other contaminants downstream. The "acute toxic event" killed 80 percent of the westslope cutthroat trout and brook trout in a 10-mile stretch of the Blackfoot. A 1991 investigation found heavy levels of cadmium in stoneflies and trout more than 46 miles downstream. Recently, FWP biologists have found that cutthroat numbers are still roughly 75 percent below those of the early 1970s in two stretches of the upper Blackfoot below the rebuilt dam. A 2005 U.S. Forest Service report warned that the earthen structure is deteriorating and could blow out again at any time, sending 350,000 cubic yards of contaminated tailings into the Blackfoot. "When you talk about leaving heavy metals contamination at the head of a major blue-ribbon trout river system, there's no bigger threat in Montana than the Mike Horse Dam," says Ron Pierce, FWP fisheries biologist in Missoula. Under pressure from Montana officials, mine owner Asarco LLC of Arizona signed a settlement in March 2009 with the state and the federal government in which it agreed to remove the dam and nearby contaminated tailings.

Dozens of smaller trout streams throughout western Montana also are impaired by acid mine drainage and dissolved heavy metals. Some have only minor effects, such as slightly reduced aquatic insect and trout populations. Others have been severely degraded for decades. Belt Creek near Great Falls once attracted a trainload of anglers each weekend during the early 20th century. It grew so polluted from silver and zinc tailings that by the mid-1930s most trout had died and, a local newspaper lamented, "the fishing tribe is no longer evident."

CITIZENS SNUBBED CYANIDE

Trout in Belt Creek and many other streams are literally breathing easier thanks to Montana environmental regulations and laws, such as the Natural Streambed and Land Preservation Act, that make new min-

Tom Dickson is editor of Montana Outdoors.

CANADA MINE THREATENS MONTANA TROUT

A proposed coal mine in Canada just north of Glacier National Park poses a threat to trout in the North Fork of the Flathead River system. A recent study by federal and state biologists found that a mine proposed by Cline Mining Corporation in British Columbia could directly destroy or extensively pollute spawning tributaries used by Montana trout. One threat is selenium and other contaminants leaking from the mining site into spawning waters used by bull trout from as far away as Flathead Lake. Another concern is that dump sites would fail and flood North Fork of the Flathead River headwaters with thousands of tons of mining waste. The mine, now moving through the province's project approval process, would remove an entire mountain as Cline processed two million tons of coal per year over two decades. "We know now, without a doubt, that there is no way they can put in a mine of that scale without seriously damaging Montana's trout fisheries," says Mark Deleray, an FWP fisheries biologist in Kalispell who worked on the study. In April 2009, American Rivers placed the North Fork of the Flathead on its list of the nation's ten most endangered rivers due to environmental threats from the proposed mine.

The North Fork of the Flathead River. A proposed Canada coal mine upstream could wipe out trout spawning beds with mining waste.

TOM PATRICK

ing operations less harmful to streams. Citizens banned the cyanide heap-leach method on new mines in 1998 with a ballot initiative. Today, all mines must obtain state and federal operating and discharge permits before work can begin. The state also requires mines to post reclamation bonds to cover cleanup costs in case the company goes bankrupt. As part of their reclamation requirements, mining companies often must build artificial wetlands and ponds that filter and neutralize toxins. At some sites, expensive water treatment plants that use lime to neutralize toxic discharges are required.

One mining company is going further. Stillwater Mining Company signed a "good neighbor" agreement for its Stillwater and East Boulder mines near Nye, just north of the Absaroka-Beartooth Wilderness. The binding contract gives citizens oversight of mining operations and establishes high water-quality standards for the Stillwater and East Boulder rivers—both prime trout streams. Just as important, says Kuipers, is the area's geology, which lacks the pyrite that produces acid mine drainage. "No mine in North America better exemplifies how to do things right than the Stillwater," he says.

Montana has been a national leader in repairing trout waters, including those harmed by mining. Trout Unlimited and state and federal agencies have restored stream stretches by removing contaminated solid wastes, resloping stream banks to their natural contours, and planting willows and other native vegetation to shade and stabilize banks. Some restoration work is as industrial as the mining itself. Restoring 3,000 feet of a trout stream at the Whites Gulch placer mine in the Big Belt Mountains required moving tons of dredge piles to reconnect stream stretches. "We had to practically recreate an entire 17-acre floodplain," says Ron Spoon, FWP fisheries biologist in Townsend.

By far the state's most significant mining waste restoration is on Silver Bow Creek and the upper Clark Fork River. Under a settlement between the state of Montana, the federal government, and Atlantic Richfield Company (ARCO), the company paid the state $498 million. Much of the money is going to projects directly or indirectly helping trout water. The DEQ has spent

SEBASTIAN CULBRETH/ EARTHWORKS

HELENA INDEPENDENT RECORD

MONTANA DEQ

BLEEDING TOXINS Sulfuric acid (above) leaks from the abandoned Mike Horse zinc and silver mine into a tributary of the famous Blackfoot River. Mike Horse Dam (below left) blew out in 1975, sending 100,000 tons of contaminated tailings into the Blackfoot and causing one of the worst trout kills in Montana history. The earthen dam was repaired, but a recent report says it could blow out again anytime. Under pressure from Montana officials, Asarco LLC of Arizona agreed in March 2009 to remove the dam and contaminated mine waste at the site. Below right: An FWP researcher collects aquatic insects on the Blackfoot to analyze for metals. A 1991 investigation found high levels of cadmium in stoneflies and trout more than 46 miles downstream from Mike Horse Dam.

$80 million on removing streamside tailings and other remediation work on 23-mile Silver Bow Creek to reduce human health risks from hazardous mining and smelting substances. Roughly $140 million of the settlement, which is administered by the Montana Department of Justice's Natural Resources Damage Program, is paying for projects such as removing trout barriers and contaminated sediment, purchasing conservation easements, and restoring tributary streams. Meanwhile, the EPA has overseen the removal of Milltown Dam in 2008 and 2 million tons of contaminated sediment at the dam site. "For the first time in more than a century, we're seeing trout swimming in Silver Bow Creek and migrating upstream past the old Milltown Dam site," says Richard Opper, DEQ director.

A GOOD START, BUT NOT ENOUGH

Despite permit requirements and remediation plans, however, new mines can still end up contaminating trout streams. "The regulatory safeguards are definitely better than they used to be, but we still need to do more to protect trout," says Skaar. "With new mines, there's still no way of knowing what the impacts to streams and other surface water will be 50 or 100 years from now. Even the best remediation plans don't always work out." Farling of Trout Unlimited notes that agencies rarely deny hardrock mining permits. "And even when a mine is permitted, you still have this major industrial activity occurring on a mountainside," he says.

Another concern is "underbonding." Beal Mountain Mine owner Pegasus Gold Corporation of Canada posted a $6.3 million reclamation bond before going bankrupt in 1997 after nine years of operation. The bond has covered less than half of what the U.S. Forest Service has spent so far treating the polluted mine site. Kuipers estimates long-term treatment could run another $20 million. "Regulators aren't adequately predicting water contamination at hardrock mines and, as a result, they aren't requiring adequate financial assurances," he says.

Farling and other conservation leaders say the biggest obstacle to more environmentally friendly mining is the General Mining Act of 1872. Signed into law by President Ulysses S. Grant, the law made mining the highest priority use on 270 million acres of federal lands. That's still the case 137 years later. According to Farling, managers of national forests and most other federal lands have little say in the

ANTIQUE MINING LAW FACES REFORM

Congress passed the General Mining Act in 1872 to spur development of the West by making it easier to stake gold, silver, and other hardrock mining claims. Unlike laws regulating coal and other types of mining, however, the 1872 Mining Act today remains relatively unchanged. Under the federal legislation, mining still "takes precedence over all other public land uses, including hunting and fishing," said former U.S. Forest Service chief Mike Dombeck when testifying last year on the 1872 law before the Senate Committee on Energy and Natural Resources. As a result, Dombeck told the committee, "it is nearly impossible to prohibit mining under the current framework of the 1872 mining law, no matter how serious the impacts might be."

NATIONAL ARCHIVES

President Ulysses S. Grant signed the law that still governs most hardrock mining in the U.S.

The law still allows private companies to not only lease but also own mining claims (called "patenting") on public land for just $5 an acre and extract gold, platinum, silver, and other valuable minerals. (Though a moratorium was placed on the patenting of mining claims during the Clinton Administration, it can be lifted at any time.) And while companies that extract coal, oil, and gas on public land pay royalties to the government, no royalties are paid for hardrock mining (though mines pay local, state, and federal taxes).

For decades Congress has been unsuccessful in reforming the 1872 Mining Act, but that may change soon. A popular bipartisan bill is now working its way through Congress. Among its most important provisions that would protect trout streams and the public's pocketbook:

- Permanently end public land sales for hardrock mining (allowing only leases)
- Keep mining farther away from wilderness and other sensitive areas
- Impose royalties of 4 percent on existing mining operations and 8 percent on new ones (70 percent of the royalties would go to states for reclaiming abandoned mines and 30 percent to communities to ease the effects of boom-and-bust mining development)
- Give managers of national forests and other public lands the right to refuse a mine

In January 2009, National Mining Association president Hal Quinn responded to reform legislation by saying that royalty requirements would force some mining companies to move their operations overseas. He said his organization supported "responsible updates" to the General Mining Act of 1872, but that the proposed reforms "would needlessly jeopardize U.S. metals mining, further increasing our dependence on foreign sources."

Many sportsmen think otherwise. More than 400 hunting and angling groups—including the American Sportfishing Institute and the Pope and Young Club—have signed a letter to Congress calling for reform to the 1872 Mining Law. In a 2007 letter to their colleagues in Congress, Representatives Paul Ryan (R-Wisconsin) and Ron Kind (D-Wisconsin), co-chairs of the Congressional Sportsmen's Caucus, wrote, "It is estimated that since the Mining Law of 1872 was enacted, the U.S. government has given away more than $245 billion of minerals through royalty-free mining and 'patenting,' the forced sales of federal lands. Taxpayers must bear the cost of cleaning up abandoned hardrock mines, which is expected to exceed $30 billion." ■

matter, regardless of the predicted harm to trout streams, endangered species, and other valued natural resources (see sidebar, page 22). "They can prescribe mitigation and some protective measures, but they cannot say 'No, there will be no mine here,'" he says. That might have made sense when pioneers were streaming west, but not in the 21st century, when public values have long since changed.

During mining's heydays, prospectors whispered excitedly about gold and silver strikes. These days, anglers and biologists are just as excited discussing genetically pure cutthroat populations and restored bull trout spawning sites. Pristine coldwater streams are becoming Montana's new *Oro y Plata*. Many new businesses cite the scenery, fishing, and clean mountain environment among reasons for relocating to Montana. According to the U.S. Fish and Wildlife Service, tourists to Big Sky Country pay more than $100 million each year for guided fishing trips, lodging, equipment, meals, and other trout-related expenses.

Hardrock mines definitely produce jobs. But they also require cleanup, and even the most lucrative strikes eventually play out. A cold mountain stream, on the other hand, will produce scenery and trout forever—if allowed to. If Montana wants to sustain both its mineral wealth and its coldwater wealth, it may need to find better ways to prevent the one from degrading the other.

LEARN MORE:

Sportsmen United for Sensible Mining (sensiblemining.org) is an alliance of hunting and fishing groups coordinated by the National Wildlife Federation, Theodore Roosevelt Conservation Partnership, and Trout Unlimited.

See the SUSM website for the publication *Sensible Solutions to Hardrock Mining*.

Trout Unlimited (tu.org) has facts about abandoned mines on its website under "Conservation." For a copy of TU's color hardrock mining booklet *Settled, Mined & Left Behind*, contact Elizabeth Russell at (303) 440-2937, ext. 102 or erussell@tu.org.

DENVENBRYAN.COM

THE NEW GOLD? Increasingly in Montana and other western states, people are recognizing that clean coldwater streams are as valuable as traditional natural resources. As gold, silver, and copper did 100 years ago, clean streams and healthy wild trout populations attract visitors and new residents from across the United States. The newcomers add wealth in the form of tourism expenditures and new businesses. One big difference between Montana's traditional treasures and its new ones: When kept free of contaminants, mountain streams never play out and never need cleanup.

FISHEYEGUYPHOTOGRAPHY.COM

WAY COOL Kids love to fish. And they love it when adults take them along and show them how. Even if you don't know a thing about fishing, by following a few easy guidelines you can have your kids or grandkids rigged and ready to go by this weekend.

A basic guide to taking kids fishing (for adults who don't have a clue).

LET'S GO CATCH SOME FISH!

BY DAVE HAGENGRUBER

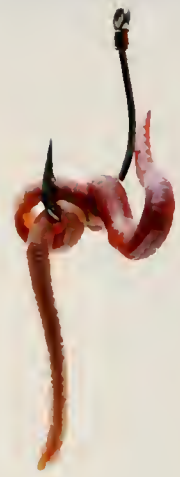
One of life's simplest—and least expensive—joys is to spend a day fishing with friends or family. You get to be outside, enjoy the natural world, and maybe even hook a fish or two. Fishing is especially fun for kids. They love learning to cast, exploring the shoreline, and seeing birds and other wildlife near the water. And if they catch fish, get ready for some major noise. There are few sounds more exciting—to kids or to parents—than "Mom! Dad! I *got* one!"

Fishing also offers kids time away from television, computers, and cell phones. It takes them to places where family members can talk without distraction, or just sit quietly and enjoy the silence together. Kids learn a lot more than how to tie a knot or cast a line. By fishing, they develop patience, problem-solving skills, and an awareness and appreciation for the natural world.

Unfortunately, many parents don't know much about fishing. That makes it difficult to introduce kids to the sport. Going fishing isn't as convenient as walking down to the playground and kicking a soccer ball around. But it's also not nearly as difficult as it looks. Over the years I've taken thousands of school kids fishing. By following the tips provided here, you and your kids can be fishing this weekend—and having a great time doing it.

MAKE A PLAN

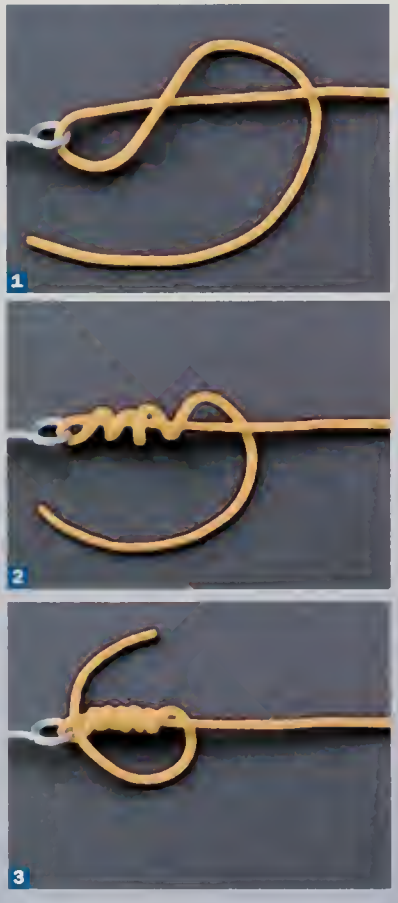
Step one is to figure out where to fish. That determines everything else, from the gear you'll need to the likelihood of catching something. Look for a pond where you can catch sunfish or stocked trout from shore. Fish size or species is not a big deal to kids, at least when they are first learning. They enjoy catching a dozen tiny sunfish or perch in an hour far more than spending the entire day trying to catch just one big fish. Sure, lunker walleyes and trout are glamorous, but to a beginner, any fish is a good fish.



ISTOCKPHOTO.COM

THE ESSENTIAL KNOT

To attach a hook or lure to the fishing line so it doesn't come off, you need to use a clinch knot. It's easy to tie:



ANIMATEDKNOTS.COM

(1) Thread the line through the eye of the hook. (2) Wrap the end around the taut line five complete turns. (3) Pass the end back through the loop next to the eye. Pull tight and trim the excess.

Ask friends and co-workers for advice on kid-friendly waters where a youngster has a decent chance of catching fish. A few towns have Children's Fishing Waters. Biologists with Montana Fish, Wildlife & Parks manage these ponds to provide fishing opportunities for young anglers. Find a list on the FWP website at http://fwp.mt.gov/fishing/fishingmontana/fishingponds.html. Also, check FWP's on-line Fishing Access Guide to find the closest lakes or ponds. Or call the nearest FWP office and ask a fisheries biologist or game warden what local waters might work best.

Try to stay close to home. When your fishing spots are nearby, your kids have more opportunities to go fishing.

Schedule fishing trips for when fish are most active. In spring and fall, fish tend to bite almost any time of day. But in summer, plan to fish in the morning and evening, when cooler temperatures and lower light levels stimulate feeding behavior.

Every fishing trip can be an opportunity for discovering something new about the natural world.

GEAR UP

You can outfit a kid with everything necessary to catch fish for less than $25. Go to a local bait shop or sporting goods store on a weeknight when the staff isn't as busy and has more time to answer questions. Tell the salesperson you want a beginner's spin-casting outfit and related gear (see sidebar on page 28 for illustrations and descriptions).

Nothing catches fish better than live bait such as a worm, grasshopper, or half a night crawler on a small hook suspended below a bobber. (And kids love watching bobbers float on the surface.) Pick up a carton or two of bait from a local fishing shop. Or dig worms from the backyard or catch 'hoppers in grassy fields in late summer. Many kids like collecting bait as much as fishing.

STAY ON SHORE

The best place to introduce kids to fishing is from shore. They have more room to move around, and everyone has easier access to restrooms, drinking water, and your vehicle. It may seem like every Montana angler fishes from a boat, raft, or canoe, but you don't need them to catch fish.

The trick to shore fishing is to not stay in one place too long. Fish are relatively stationary. They won't come to you; you have to find them. Move along the shoreline trying new areas until you find where fish are biting. If the weather is warm enough, wear old tennis shoes, shorts, and a life jacket and wade in shallow water along shore. That helps you cast farther into the pond.

To find fish, learn to think like a fish. Besides finding enough food to survive, a fish's main concern is to avoid being eaten by predators. Cast to deep water near rocks, logs, and weedbeds, where fish feed while hiding from herons and ospreys. Fish avoid shallow water off sandy beaches because they are too exposed, which is why you rarely catch fish in swimming areas.

HELP, BUT NOT TOO MUCH

I've seen too many parents spoil a family fishing trip by "taking over" when their kid is having trouble casting. The adult commandeers the rod and reel and spends the next hour doing all the fishing while the child sits there, bored. Find a balance between offering enough help so the trip is a success, but not so much that you do all the fishing. After showing your kids the basics, back off a bit while they figure things out for themselves. Let kids know you are there to help—but only if they need it.

ENJOY THE SURROUNDINGS

Don't get so caught up in the fishing itself that you and your kids miss other attractions. Show them the different bird species—such as kingfishers, herons, ospreys, and ducks—attracted to ponds and streams. Let your kids catch turtles and frogs in the shallow water. Or turn over rocks to find bugs and crayfish.

Dave Hagengruber coordinates the FWP Angler Education Program.

BETTER THAN XBOX Can't pry your kids from the electronic game console? Take them fishing—the ultimate reality game. Top left: Catching a trout can even pump up your pre-teens. Top right: Though kids generally have short attention spans, you'll be amazed at how long they can stare at a bobber. Above left and right: Kids don't need to catch lunkers to have fun. To beginners, any fish is a good fish.

Sure, all that splashing might scare fish. But so what? It's still fun.

If you return to a fishing spot several times during the year, point out where reeds and other plants along shore have grown taller as the summer progresses. Talk about cottonwood leaves turning yellow in late summer, or how creek and pond levels rise and fall with the seasons. Every fishing trip can be an opportunity for discovering something new about the natural world.

HAVE A PICNIC

Food and drinks are essential for a successful fishing trip. A simple picnic lunch outdoors can be as much fun as the fishing.

KEEP TRIPS SHORT

Kids have short attention spans—even when fishing. It's always better to cut the trip short and leave kids wanting more than to stay too long and hear the dreaded, "We're *bored!*"

PLAN FOR THE CATCH

Kids love to look at pictures of themselves

Basic fishing gear

To take a kid fishing, you'll want to become familiar with this fundamental gear:

Note: *This equipment is for what's known as spin fishing. In spin fishing, you cast a lure or a baited hook. The weight of the lure or bait allows you to cast far into the water. Spin fishing is different from fly fishing, in which you cast a tiny fly that's light as a feather using a completely different type of rod, reel, and line. Look for information on fly fishing basics in a future issue of* Montana Outdoors.

Montana Fishing Regulations: Includes the laws all anglers must follow and lists fishing waters throughout Montana. Find the regulations at sporting goods stores, fly shops, FWP offices, and on-line at fwp.mt.gov.

Fishing licenses: Kids under age 12 do not need any type of license. See the FWP website for requirements for older children and adults.

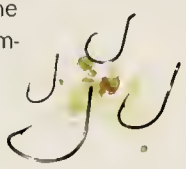
Personal Flotation Device (also known as a PFD or life vest): Required for everyone when in a boat, regardless of age. Kids age 12 and younger must wear one while in a boat and should wear one when near water. Older kids and adults should consider wearing one when wading.

Reel: A spin-cast reel-and-rod combination is the easiest outfit for kids to use. It's also the cheapest to buy. Before heading to the stream or pond, practice casting in the backyard for a few minutes. Kids quickly learn how to operate the simple push-button mechanism and make fairly accurate casts. Also popular but a bit harder to learn is the spinning reel (which sits *below* the rod handle, unlike the spin-cast reel, which sits *on* the rod handle).

Rod: Short rods 4 to 5 feet long are generally easier for kids to handle than longer rods.

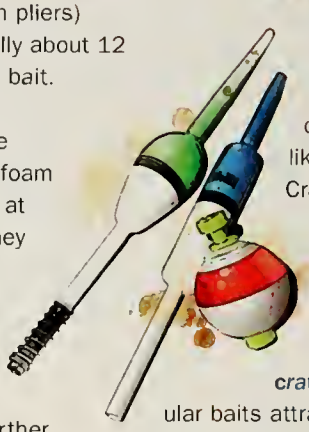
Line: Line is sold according to its strength (called "test"), ranging from 2-pound test up to more than 30-pound test. A good all-purpose line is 6-pound-test clear monofilament.

Hooks: If you use bait, you'll need hooks. The smaller the number, the larger the hook. Smaller size 8 hooks are best for trout, sunfish, and carp. Larger size 4 and 6 hooks are good for walleyes, bass, and catfish. "Bait-holder" hooks have small barbs on the shank that keep worms or other bait from slipping off.



Sinkers: These weights keep your bait down near the bottom of the pond or stream, where most fish swim. Split-shot sinkers have a split down the middle that allows you to pinch it (with pliers) onto the line, usually about 12 inches up from the bait.

Bobbers: These are made of plastic or foam and keep your bait at a certain depth. They also let you know when a fish has grabbed the bait. A bobber adds weight to the line to help you cast farther.



Lures and bait.

Spinners: Spinners have a metal blade that spins around a central metal shaft. The flash of the spinner resembles a minnow.

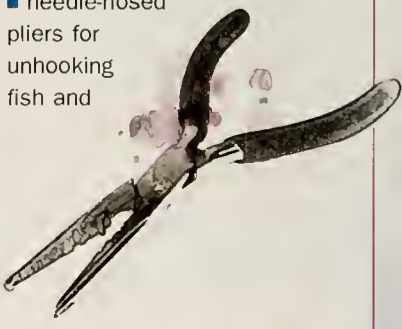
Use a small snap-swivel between the line and the spinner to keep the line from twisting. Spinners are great for any type of fish. Use smaller versions for trout and sunfish and larger ones for walleyes and bass.

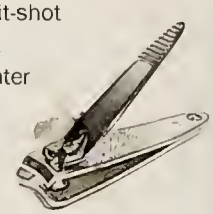
Crankbaits: These imitate minnows. The lip on the front causes the crankbait to dive and wiggle like a real fish. Crankbaits are excellent for walleyes, bass, and big trout.

Worms and night crawlers: These popular baits attract any species of fish. Keep them in a cool, moist place, out of the sun.

Other handy items:

- plastic tacklebox to store fishing gear
- stringer to keep your catch fresh in the water
- hand towel for wiping slime off your hands or your kids' hands after handling fish
- needle-nosed pliers for unhooking fish and crimping split-shot
- first-aid kit
- drinking water
- fingernail clippers to cut line and trim knots





ILLUSTRATIONS BY RON FINGER/REDPINE STUDIO

I *DID* IT! Help out, but not too much. Find a balance between offering some assistance (above: netting a trout) without taking over. You'll be surprised at what kids can do on their own when given half a chance—like hooking and landing a nice largemouth bass (below).

holding their catch, so always take photographs. Many kids also like to eat their catch. If you plan to keep some for a meal, bring along a small cooler and ice. Clean the fish quickly, get them on ice, and try to eat your catch that same evening. Fish taste best when both the meat and the memories are still fresh. If you choose to release fish, be sure to let your child help put them back in the water.

BE SAFE

Fishing is fun, but it involves hooks and water, so safety is always a top concern. Bring a life jacket for each child—even when shore fishing. Also, bring sunscreen and brimmed hats, as well as sunglasses for eye protection (polarized sunglasses also help you see fish in the water.)

Don't worry if you don't catch fish, because it happens, even to experienced adult anglers. The day can still be successful. Kids can have plenty of fun skipping rocks or looking for frogs. Maybe they'll see a bald eagle soar overhead or a mink scamper along the bank. Or they finally learn how to cast, or they tie their first clinch knot.

It's not always easy to take kids fishing. I've seen more than my share of tangled lines, spilled tackle boxes, and broken rod tips. But it's always rewarding. By introducing kids to fishing, you can instill a lifelong love of the sport and a desire to help protect and conserve Montana's lakes and streams. Just as important, you'll create memories your family can share for years to come.

Landscape with native plants to create habitat that attracts a wide variety of bird species.

Growing a

By Craig and Liz Larcom

David Schmetterling and Marilyn Marler live in the middle of Missoula on an average city lot. You'd think such a location wouldn't be a birding hotspot, yet over the past several years the couple has identified more than 50 different bird species attracted to their yard.

Their strategy? Call it, "Plant it, and birds will come."

Schmetterling and Marler are among the growing number of Montanans discovering the value of "birdscaping"—creating a residential landscape that attracts birds. The idea has been cultivated over the past few decades by bird-loving gardeners and landscapers across the United States who noticed that some plants attract certain birds and others don't. Over time they have learned that a naturally landscaped yard can attract dozens of bird species. For example, the right flowers provide nectar for hummingbirds. And insects drawn to native landscaping attract warblers that would never touch a bird feeder. What's more, birds often linger in a birdscaped yard rather than simply nip in for a few minutes to fuel up at a feeder. The right shrubs and trees can make birds feel comfortable in severe weather and safe from predators such as sharp-shinned hawks (though these and other small raptors sometimes appear in birdscaped yards—an extra treat for birders). Shrubs and trees also make fine nesting sites, so you have a chance to hear the chirps of newly hatched chicks and watch the clumsy antics of fledglings. Include a birdbath, and a birdscaped yard serves up everything birds need—cover, food, water, and nesting places—to thrive. In other words, your yard and garden become bird habitat.

Cedar waxwing with a golden currant

BEV KIRSCH

Bird Garden

Native plant species are key to successful birdscaping. Birds indigenous to a particular region have thrived over thousands of years on local plants. Native vegetation provides a succession of foods at just the right time to get birds through the year, and it survives Montana's temperature extremes. What's more, native plants need no special watering or fertilizing. Another benefit, say Marler and Schmetterling, is that surrounding their home with plant species native only to the surrounding wildlands restores a sense of what Schmetterling calls "regional distinctiveness" to their property. "We like having plants that are from here and in many cases are found nowhere else," he says.

Another reason for using native vegetation to draw birds is that it rarely attracts nuisance bears the way commercial bird food can. "Bears can become addicted to bird seeds," says Kristi DuBois, Montana Fish, Wildlife & Parks native species biologist in Missoula. "And then they hang around a yard and create a human safety problem." Bears are unlikely to "raid" your wild-growing bird foods because they can find the same items in the wild. For instance, bears gorge on woodland huckleberries but generally stay clear of native berries in backyards because the source is not concentrated enough to make the visit worthwhile. And though they often raid hummingbird feeders, bears are not known to sip nectar from backyard wildflowers.

Birdbath in a garden of native plants

MARILYN MARLER

When it comes to birds, having bugs around is a great thing. Baby birds especially need insects to survive. But most foreign plants found at garden centers are unfriendly to native bugs that birds eat. Douglas Tallamy, a professor of entomology at the University of Delaware and author of *Bringing Nature Home: How Native Plants Sustain Wildlife in Our Gardens*, writes that the alien ornamentals that dominate most yards produce physical and chemical defenses that native insects

haven't evolved with. The bugs die or move elsewhere. That leaves birds with less food and forces them to move elsewhere, too.

Schmetterling, an FWP fisheries biologist, and Marler, a University of Montana botanist, understand that many homeowners balk at the thought of attracting insects. "But we don't consider insects a problem," Schmetterling says. "We like having caterpillars and moths and native bees in our yard. We consider them to be beneficial, not to mention that they provide food for birds." Butterflies are especially welcome. "We like seeing them as much as the birds," he adds.

"We like having caterpillars and moths and native bees in our yard. We consider them to be beneficial, not to mention that they provide food for birds."

The popularity of birdscaping appears to be growing in parts of Montana. Sharon Browder, a landscape designer in the Bitterroot Valley, says nearly all her clients want gardens and landscapes that attract birds. Alex Blake, co-owner of Blake's Nursery in Big Timber, says so many of his customers want to attract birds with their gardens that he's having trouble locating enough native plants to fill the growing demand. "We grow some of our own, and we plan to grow even more," he says. The nursery has had success producing custom mixes of native grass species and promoting "bio-hedges." The diverse mixes of mostly native trees and shrubs block wind, attract birds, add year-round color, and need little watering.

Interested in birdscaping your property? You'll find loads of information on-line (see page 35), ranging from basic how-to manuals to detailed guides on soil chemistry, sod removal, plant disease, and more. Some garden centers can provide advice or direct you to landscape designers with expertise in native planting. Keep in mind that many nurseries deal almost entirely with plants not from your region and may lack knowledge about true natives. (Some nurseries label as "native" any plant indigenous to the United States.)

Here are some rough guidelines to get you started birdscaping your property:

1. Map the yard.
Before you start planting, start drawing. Sketch a rough map of your yard, including sidewalks, driveways, and existing trees. To determine appropriate plants to place in different areas, you'll need to figure out sun exposure, annual moisture, topography, drainage, and views you want to preserve or screen out. For example, if most of your yard is on a shady, north-facing slope, then prairie plants likely won't get enough sun to thrive. Similarly, a thirsty, shade-loving red-osier dogwood will probably die on an open, south-facing slope.

2. Learn about local native plants.
The vegetation that will grow best in your yard was likely there before your house was built. Walk through the nearest open space to get a sense of what species thrive in your area's particular soil and annual moisture. Ask advice from neighbors who garden and landscape using native species. Visit nearby wildlands to become familiar with local plant communities. And remember that just because a plant is native to Montana doesn't mean it will grow well in your area. The

Craig and Liz Larcom are freelance writers and photographers in Great Falls.

Great for golf but not birds

There's nothing wrong with a traditional lawn if you like the clean, manicured look—and don't mind endless mowing, weeding, and watering. But if you like to see birds, the traditional lawn is not the place to look. You may get a few robins searching for worms when the sprinkler is on and, of course, the universally present house sparrows, but not much else.

Dotted blue butterfly on shrubby cinquefoil

Rufous hummingbird

LEFT TO RIGHT: ISTOCKPHOTO; KRISTI OUBOIS; BECCA WOOD

Marler and Schmetterling's birdscaped backyard

MARILYN MARLER

blanketflower that blooms in sunny Jordan might wither in shady Troy.

The sidebar on page 34 lists bird-friendly plants recommended by Montana experts. Another great source is the Montana Native Plant Society website (mtnativeplants.org), which has recommendations for each area of the state. Birds enjoy a wide range of plant sizes, shapes, fruits, and seeds, so the more diversity the better. Consider a dozen or so species your first planting year, then expand later. Schmetterling and Marler have planted more than 100 species native to the Missoula area. "There's always something blooming, from buttercups in March to rabbitbrush still flowering in October and November," Schmetterling says.

Another resource is the U.S. Department of Agriculture plant database, which shows pictures of most native plants. Click on the "Plant Guide" to learn more about the plants that interest you. Write down the scientific name of each species you intend to purchase. Plants go by many different common names; by knowing the scientific name, you can be sure you are getting what you want.

3. Design the plantings.

Just because you are creating wildlife habitat does not mean your bird garden has to look like an overgrown jungle. You can give native landscaping a tidy look by edging grass from other plantings, lightly pruning shrubs, and installing stone, gravel, or wood chip walkways. Marler contains milkweed, goldenrod, and other plants that spread quickly by planting them in a pot or bucket with the bottom removed.

In the backyard, Browder's native landscaping designs become less constrained. There she aims to create a more natural look, while still providing the benefits her clients want, such as privacy, shade, color, and birds.

"A native garden doesn't mean you just let it go wild. There still needs to be thoughtfulness. You still need to maintain it."

Native landscaping does not necessarily mean kissing your manicured lawn goodbye, either. Schmetterling and Marler have retained small islands of lawn just for sitting. Browder retains larger areas in some backyards for pets and play areas, landscaping around the borders. Even converting just 10 percent of a lawn to native vegetation can make your yard more attractive—both to people and birds.

Schmetterling notes that a vacant lot overgrown with weeds doesn't qualify as birdscaping. "A native garden doesn't mean you just let it go wild," he says. "There still needs to be thoughtfulness. You still need to maintain it. You can't just let it grow into a weed patch and call it a native planting."

Think about what you want from your plantings in different seasons. Grasses, for example, often look best in winter, poking up through the white snow. Evergreens shield your house from winter storms and provide shelter for birds. Deciduous trees generally are planted on the south and west

sides of a house to shade it in summer, while allowing warm sunlight in through the bare branches in winter. Use wildflowers and fall foliage to add a spark of color.

Deer are less likely to munch on native landscaping than they are on ornamentals. But that's not always the case. Some native trees—quaking aspen saplings, for example—are deer magnets. If your neighborhood is plagued by hungry deer, ask the nursery staff which plants are most deer resistant.

Silver buffaloberry

CRAIG & LIZ LARCOM

4. Buy plants.

With planting plan in hand, it's time to purchase your grasses, forbs, shrubs, and trees. Buying native is more difficult than running down to the local superstore for a flat of impatiens. Call local nurseries to see if they sell the plants you're looking for. Most carry a few native species, but don't be surprised if you have to visit a nursery out of town to find a wide variety. Visit the Montana Native Plant Society website and contact a local chapter for advice on the closest nurseries to your town that carry native species. Browder says she has been finding more and more small nurseries in the Missoula area and Bitterroot Valley offering natives. She also recommends looking for native plants at farmers' markets.

Don't dig up native plants from the wild unless rescuing some from an area about to be developed or cultivated. When asked, many landowners or developers are glad to let you take plants from a building site. Another option is to collect seeds from wild plants for planting on your property.

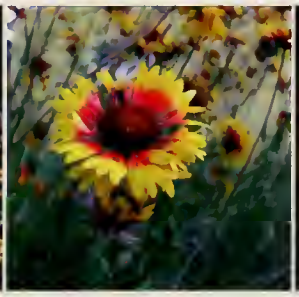
5. Plant.

Nurseries and garden centers offer plenty of advice on how to get your plants into the

Montana plants with high bird appeal

Greene's mountain-ash

Rocky Mountain juniper


Blanketflower

Dotted blazingstar

Woods' rose

Common name	Scientific name	Plant type	Notes
Black hawthorn	*Crataegus douglasii*	Tree	Early flowers, early berries for birds.
Chokecherry	*Prunus virginiana*	Tree	Berries attract birds.
Saskatoon serviceberry	*Amelanchier alnifolia*	Tree	Earliest flowering, earliest berries, blossoms draw hummingbirds.
Red-osier dogwood	*Cornus sericea*	Tree	Winter flowers. Berries draw catbirds and others. Needs moisture.
Greene's mountain-ash	*Sorbus scopulina*	Shrub/tree	Berries feed birds in late winter. Distinct from European ash.
Quaking aspen	*Populus tremuloides*	Tree	Borers attract woodpeckers.
Rocky Mountain juniper	*Juniperus scopulorum*	Tree	Berries feed birds in winter.
Golden currant	*Ribes aureum*	Shrub	Early spring flowers draw hummers. Berries feed many bird species.
Oregon grape	*Berberis repens*	Shrub	Hummingbirds like flowers. Berries for other birds.
Woods' rose	*Rosa woodsii*	Shrub	Birds eat rose hips in late winter.
Silver buffaloberry	*Shepherdia argentea*	Shrub	Songbirds eat berries in late summer.
Dotted blazingstar	*Liatris punctata*	Flower	Important nectar source for butterflies. Flowers attractive to birds.
Beebalm or wild bergamot	*Monarda fistulosa*	Flower	Easy to grow. Hummingbird favorite.
Blanketflower or common gaillardia	*Gaillardia aristata*	Flower	Juncos and other birds eat seeds.

LEFT TO RIGHT: CRAIG & LIZ LARCOM; CRAIG & LIZ LARCOM; MARILYN MARLER; CRAIG & LIZ LARCOM; CRAIG & LIZ LARCOM

ground. Be sure to water new plantings regularly the first year until they take root. A layer of wood chips or mulch around new plantings will keep weeds down.

6. Enjoy.

Schmetterling says that within the first year of planting, he and Marler began seeing more birds around their house. And after only a few years, they had identified dozens of species. "It's always fun just to look around in the garden any time of the year and see what's out there," says Schmetterling. Many people think they need to leave town to get their wildlife fix. But with a birdscaped yard, you can stay home and let the wildlife come to you. "I'm outdoors a lot with my job or when I'm hunting or fishing, and I get to see wildlife all the time," says Schmetterling. "But there's something really gratifying about seeing a chickadee in the backyard eating aphids off a serviceberry you planted yourself."

Gardening and birding blogs

Look for more information on native landscaping on the blog maintained by David Schmetterling. He includes before and after photos of his and Marler's garden; tips on dealing with squirrels, cats, and other unwanted visitors; suggestions for site preparation, plant selection, and garden design; and more:
montanawildlifegardener.blogspot.com

Other bird and garden blogs:

gardeninggonewild.com
gardenrant.com
daffodilplanter.blogspot.com
smallgoatgarden.blogspot.com
bikegarden.blogspot.com
prairieice.blogspot.com
birdstuff.blogspot.com
birdsinyourbackyard.com

PHOTOS BY MARILYN MARLER

Resources for native plant gardening

- **Montana Native Plant Society** offers guidelines for selecting native plants for landscaping in Helena, Bozeman, Missoula, and the Flathead Valley. Contact local chapters for advice on where to buy native plants in your area. Visit them at mtnativeplants.org, or write to P.O. Box 8783, Missoula, MT 59807.
- **Natural Resources Conservation Service's** "How To Landscape with Native Plants in the Northern Great Plains and Rocky Mountains": mt.nrcs.usda.gov/technical/ecs/plants/xeriscp/, or (888) 526-3227.
- **USDA Plant Database:** www.plants.usda.gov. See the site's "Plant Guide."
- The National Wildlife Federation's **Backyard Wildlife Habitat Program:** nwf.org/backyard.
- ***Landscaping for Wildlife*** by Carrol Henderson. Though written for Midwestern homeowners, much of the information in this book is applicable to Montana. Available from many on-line booksellers.

BOB MARTINKA

With measuring tools ranging from old-fashioned yardsticks to high-tech Doppler radar, streamgagers watch the state's potentially dangerous rivers.

MONITORING MONTANA'S

BY BECKY LOMAX

Greg Trunkle perches 20 feet above the muddy North Fork of the Flathead River in a metal-framed cable car attached to an inch-thick galvanized cable. The river churns with late May runoff at Glacier Rim, about 4 miles upstream from where the river meets the Middle Fork of the Flathead at the southwest corner of Glacier National Park. Trunkle, a streamgager for the U.S. Geological Survey (USGS), hand pulls the cable car across the 200-foot-wide channel, stopping every 5 feet to measure the river's depth and speed. As the car bounces from his movements, he winches a 100-pound torpedo-shaped lead weight down into the torrent. All the while, he eyes the water upstream to make sure no floating trees or other debris will snag the weight and tear it—and the cable car—into the swollen river. As the weight touches the riverbed, an attached meter in Trunkle's hand displays the water depth.

He cranks the weight a few feet off the bottom. Above the weight, six tiny cone-shaped cups spin on a horizontal wheel, producing audible clicks. The rate of the clicks tells Trunkle the river's velocity. He jots the data in a notebook dangling from a cord around his neck, slides the car another 5 feet, and repeats the process.

For more than 100 years, streamgagers have been wading streams and dangling from cables above rivers to gather information critical for flood forecasting, bridge construction, water quality monitoring, and various uses of streams. Gaging (spelled without a "u" in this discipline) also provides vital information to anglers and rafters as they plan trips, adjust angling strategies, and determine whether rivers are safe enough to float.

In the Middle Fork of the Flathead River lurks a massive boulder known as the Can Opener. When the river runs high, at 5 or 6 feet, rafters splash safely over the rock. But as flows drop in summer, the rock emerges, snagging boats and knocking riders into the river. "As soon as the river drops to 4 feet, our guides know to watch out," explains Randy Gaynor, owner of Montana Raft Company in West Glacier. Gaynor and his guides also track streamflow to learn when snowpack runoff has peaked and they can begin scheduling fishing trips. "When the river maintains a consistent drop, that's a good indication it will clear up soon and the fishing will be good," says Gaynor.

ESSENTIAL INFORMATION

Because rivers can be dangerous, they require constant surveillance. When engorged with high water they can destroy property, drown boaters, and blow out bridges. When river levels drop too low, fish die and water needed for drinking, irrigation, and industry slows to a trickle. To keep a close watch on rivers, the federal government maintains a little-known but essential service called streamgaging.

Streamgagers measure "flow," or discharge—the total volume of water moving past a point on a river in a given time. Measured in cubic feet per second (cfs), flow is determined by multiplying a river's width by its depth by its velocity. That calculation would be easy if a river were all one depth and its velocity the same top to bottom, mid-stream to shore. But current speed varies widely, and stream channels are irregular. Streamgagers, therefore, measure the water depth and current speed at several

MOVING WATER

BOMBS AWAY Greg Trunkle, a federal streamgager, lowers a 100-pound device into the swollen waters of the North Fork of the Flathead River to record water velocity and depth.

ALL PHOTOS BY BECKY LOMAX, EXCEPT WHERE NOTED.

CRAIG & LIZ LARSEN

CURRENT AFFAIRS Clockwise from above left:
"Lucky" Sultz, a retired streamgager, enters a gagehouse on the Flathead River at Columbia Falls where river stage is automatically recorded every 15 seconds and transmitted by satellite to U.S. Geological Survey offices. Streamgager Phil Karper pulls his cable car across the Missouri River near Great Falls while testing current velocity. Greg Trunkle lowers a small tri-hulled boat outfitted with Doppler radar into the Flathead River. The high-tech electronics are used where rivers allow bridge access. Without bridges, streamgagers use cable cars and lower a torpedo-shaped weight fitted with a device (white arrow) that measures current velocity as it spins.

points across the riverbed to obtain an accurate picture of the river's discharge. They also record "stage," the height of the river above some given point. And at some locations, streamgagers measure water temperature and occasionally water quality.

Streamgagers update their work on average once a month and sometimes as often as biweekly, says Wayne Berkas, chief of the USGS Montana Water Science Center's Data Section. Flooding, bank erosion, and other natural processes constantly alter the shape of a channel. "The geometry of a river changes every time the river surges," says Berkas. Streams with stable channels do not need to be measured as often as those with fast-changing sandy bottoms, such as the Powder River. Also requiring more frequent monitoring is the Bighorn River downstream from Yellowtail Dam, where algae grows so thick it can alter river flow.

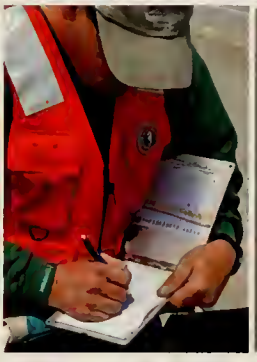
Montana's oldest gaging station still in operation is at Fort Benton on the Missouri River. Records there date to 1890, when flow and stage readings were telegraphed downstream to steamship captains so they could determine if the Missouri was navigable. Later, the USGS dispatched streamgagers from Denver and Spokane to Montana, where they rented horses to reach remote rivers. Streamgagers waded into streams and small rivers to take measurements with yardsticks, a method still used today. On rivers with bridges, they lowered a weight from the trestle. On large rivers that lacked bridges, they built cable spans like the one still used on the North Fork of the Flathead and many other large rivers across Montana. "It's technology designed in the 1930s," explains "Lucky" Sultz, a retired 27-year vereran streamgager, "but they haven't found anything more accurate."

They have found a method that's faster, however. Where bridges cross rivers, modern streamgagers use Doppler radar to measure the channel. Over the side of a bridge spanning the Flathead River in Columbia Falls, Trunkle lowers an orange trimaran equipped with a $25,000 radar device that reads the water depth and flow. While holding a line to the small boat, he pushes a baby jogger rigged with a computer and a transmitter across the bridge. In 14 minutes, he walks two round trips over and back. Doppler beams bounce off particles in the water to read the speed and off the riverbed to determine depth. "It may take longer to set up and test this than to do it by hand, but the computer shows me a whole picture of the river as I go across," says Trunkle, adding that this site would require two hours to measure the old way.

Back at his Kalispell office, Trunkle types the data into his computer. Sultz, the retired streamgager who accompanied Trunkle today, says that when he began measuring river flow and stage data in 1979, the information was hand written in ledgers and published only once each year. "The Internet was a radical change that really sped up the pace of our work," says Sultz, noting that Montana was the first state to put real-time river data on-line. "Now there's more pressure than ever to make sure the data is correct."

In addition to the information gathered by 15 field streamgagers, the USGS uses automated gaging stations at 220 sites on roughly 100 streams and rivers. These small shacks located on riverbanks contain pipes that extend into the river and monitor stage to within one-eighth of an inch every 15 minutes. The information is then transferred by satellite to a publicly accessible USGS website (see sidebar on page 40).

CRAIG & LIZ LARCOM



NO WADING TODAY Water gushing from the Morony Dam near Great Falls demonstrates the Missouri River's enormous power. The flow this day was 12,400 cfs, just one-sixth that of the record of 72,000 cfs set in June 1964. Left: Trunkle jots down flow and depth readings recorded by a Doppler radar device.

DRY FLIES OR STREAMERS?

Recreation, livelihoods, and even lives depend on the data's accuracy. Just downstream from the Camp Baker Fishing Access Site, the put-in spot for popular float trips down the Smith River in central Montana, a gage tells Montana Fish Wildlife & Parks staff when the water has dropped too low for outfitters or individuals to run drift boats or rafts. The gage also indicates when the river is too high and dangerous to float. A gage on West Rosebud Creek monitors flow from the small Mystic Lake power plant, a popular kayaking spot in the Beartooth Mountains

Becky Lomax is a writer in Whitefish.

about 75 miles southwest of Billings. Tim Tollett, owner of the Frontier Anglers fly shop in Dillon, says he and his staff regularly check the USGS website for streamflow conditions. "If the Beaverhead is at 300 cfs in mid-July, we can expect some incredible PMD (Pale Morning Dun) hatches," he says. "But if it's at, let's say, 700 cfs, then there will be way too much surface turbulence for good dry fly fishing."

"For fisheries management, streamgaging data is critical," says Andy Brummond, FWP streamflow specialist. He explains that biologists track present and historical stream flow and stage as well as stream temperature so they can make informed management decisions. Gages on the Big Hole River, for example, tell biologists when midsummer water levels drop so low they threaten arctic grayling. When trout stream temperatures soar above 73 degrees F for three days running, fisheries managers close waters to angling to prevent further stress to trout. "Without the gaging data, we would know far less about what's going on in a river that could be affecting fish," Brummond says.

Other stream flow data users include the National Weather Service, for predicting floods, and agricultural producers such as those along the Musselshell and Milk rivers, for regulating irrigation water. Public agencies and private utilities use flow reports to determine the timing and amount of water released from dams for generating hydroelectric power. On contaminated rivers such as the upper Clark Fork, a Superfund site, streamgagers regularly test water quality. On the North Fork of the Flathead, they have begun gathering baseline information to monitor possible pollution from a proposed mining operation just across the border in British Columbia.

A SAFER THRILL Rivers like the Middle Fork of the Flathead offer a wild ride but can drown rafters at high flows. River outfitters regularly monitor USGS streamgaging data to avoid dangerous conditions.

The most frequent users of streamgaging reports are ordinary anglers and recreational boaters. Nonresident trout anglers study historical hydrographs on-line to ensure their next visit to Montana coincides with the best water flows for fishing. Local anglers keep daily tabs to see if their favorite stream is wadeable, or to help determine if certain hatches have begun. Kayakers floating the Gallatin and other whitewater rivers monitor flow reports like day traders tracking the Dow Jones industrial average.

One reason Trunkle doesn't mind pulling himself out over raging rivers or wading ice-cold streams is knowing that kayakers, anglers, biologists, and industries constantly use his information. "I'm an outdoors person, and I wanted a job where I worked with rivers, so this is really a great fit for me," he says. "But we also provide an important service to the public, so that's definitely a another good thing about this job."

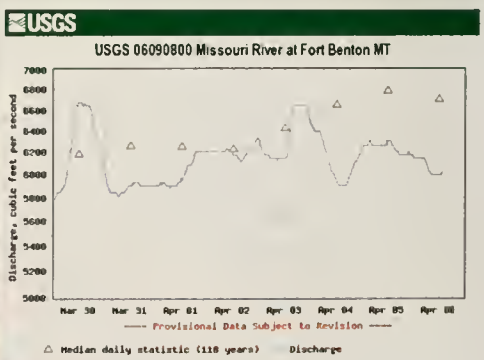
Typical gaging station components

Follow most Montana streams minute by minute

Hydrologists use gaging stations to automatically monitor river stage, flow, temperature, and water chemistry. There are 220 stations on roughly 100 rivers and streams across Montana. Real-time stream data transmitted to the USGS via satellite is available to the public at mt.water.usgs.gov. The site also shows long-term median flow and lets visitors compare current flows to the flood history of four peak years for each river.

Gaging station on the Missouri River near Fort Benton

USGS



IOWA DARTER

Etheostoma exile

By Tom Dickson

The walleye and sauger get plenty of attention in central and eastern Montana, but you never hear much about their colorful little cousin, the Iowa darter.

Darters are zippy little fish that swim along the bottom of streams or lake shallows in short bursts. These tiny members of the Percidae family, also related to the yellow perch, are found only in North America. Most of the continent's roughly 140 darter species live in the eastern United States, particularly Appalachia. None are native west of the Rocky Mountains. The westernmost range of any darter is that of the Iowa darter, which is found as far west as Alberta and north-central Montana.

IDENTIFICATION The Iowa darter is sometimes mistaken for a minnow, but it is unrelated to shiners, chubs, dace, or other minnow species. It has a slender body, which explains the second part of its scientific name, *exile*, Latin for "slim." (The first half, *Etheostoma*, comes from two Greek words meaning "straining mouth," for reasons unknown). Like other percids, the Iowa darter has a two-part dorsal fin, spiny in the front and soft-rayed in the back. Like those of so many darter species, the spawning male Iowa is brightly colored. His body is olive green with roughly ten bluish green saddle bands across the back and sides, interspersed with rust red splotches. The front dorsal fin is brilliantly colored in blue-green with blood red marks between each spine. The massive pectoral fins are fan shaped, the tail is squarish, and the head is conical. A dark blue tear-shaped mark extends down from each eye. Iowa darters average only 2 inches long, making them one of Montana's smallest fish. (The photograph above is actual size.)

KONRAD SCHMIDT/MN DNR

BEHAVIOR Most other fish can float in the water column, kept buoyant by a swim bladder, or air bladder. Lacking this feature, the Iowa darter sinks to the stream or lake bottom. To move around, it makes short dashes of astonishing speed (hence the name), often faster than the human eye can follow. The darter can zip along stream and lake substrate looking for food using less energy than other fish, which would keep floating up off the bottom.

FOOD The Iowa darter eats copepods, water fleas, and midge and mayfly larvae it finds in underwater vegetation. You'd think such a small fish living in shallow water would be prime prey for herons, kingfishers, or predator fish. But I have never found a report of Iowa darters in the stomach of any fish-eating animal. Maybe they are just too darn quick to catch.

REPRODUCTION No one has studied the mating habits of Iowa darters in Montana. But in other states where the fish is common, biologists have learned that the fish spawns in just a few inches of water among underwater vegetation or tree roots. After establishing a territory, a male chases any intruding males away. When a female shows up, he swims around and around her until she stops over the vegetation or roots he has claimed. He gets on top and holds her in place, his pelvic fins over her dorsal fin. She vibrates to release eggs, which stick to the vegetation, as he releases milt.

RANGE IN MONTANA Iowa darters inhabit tributaries of the Missouri River below Fort Peck Dam, the Little Missouri River basin in the southeastern corner of the state, and throughout the Milk River system as far west as Fresno Dam.

SEEING ONE FOR YOURSELF The best way to find an Iowa darter is to wade the shallows of the streams and rivers listed above in April and May while looking closely in the vegetation for splashes of orange or blue that indicate the spawning males. Capture one for observation using a small-mesh seining net. Don't be discouraged if you don't nab one of these lightning-fast rascals on the first attempt. One late-19th-century ichthyologist wrote that it would be easier to grab a weasel than it would be to catch a darter.

JOSEPH TOMELLERI

Tom Dickson is editor of Montana Outdoors.

PARTING SHOT

HIGHWAY HATCH

Bug-splattered license plates, bumpers, and windshields are testament to the productivity of Montana's rivers. Why do some big trout in these fertile waters select the tiniest insects and not big bugs? Find out on page 8. Photo by Brian and Jenny Grossenbacher.

ASSOCIATION FOR CONSERVATION INFORMATION

Best Magazine: 2005, 2006, 2008; *Runner-up:* 2007

Visit us on the web at:
fwp.mt.gov/mtoutdoors

Subscriptions:
800-678-6668

P.O. Box 200701
Helena, Montana 59620-0701

Produced by Montana Fish, Wildlife & Parks

Montana Fish, Wildlife & Parks

Montana Outdoors

MAY–JUNE 2009

VOLUME 40, NUMBER 3

05

7 44040 88810 4